NEWARK PUBLIC LIBRARY
MAR 12 1986
U. S. GOVT. PUBS.
DEPOSITORY 326

YOUTH & WILDLIFE

Fish and Wildlife Service
U.S. Department of the Interior

I49.2:

YOUTH AND WILDLIFE

The Beliefs and Behaviors of Fifth and Sixth Grade Students Regarding Non-Domestic Animals

Miriam O. Westervelt

and

Lynn G. Llewellyn

Division of Program Plans

Office of Planning and Budget

U.S. Fish and Wildlife Service

Department of the Interior

Washington D.C. 20240

October 1985

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402

ABSTRACT

This report analyzes the attitudes, beliefs and behaviors of a national sample of 3,087 fifth and sixth grade students concerning wildlife. The sample was randomly selected from 15,787 respondents to a Wildlife Survey distributed in Weekly Reader periodicals and reflects the demographic composition of that readership. More specifically, rural and suburban students are somewhat over represented and urban schoolchildren under represented compared to the actual distribution of fifth and sixth graders nationwide. The questionnaire examined the prevalence of four basic orientations toward wildlife (humanistic, moralistic, naturalistic, and negativistic), preferences for specific kinds of wild animals, level of factual knowledge, and popularity of eight wildlife-oriented behaviors. Comparisons with children at lower and higher grade levels, as well as adults, are based on results of earlier attitude surveys (18,19).

Children expressed more sentimental affection for loveable kinds of animals than naturalistic interest in wildlife, and demonstrated limited knowledge about wildlife. The results also indicated widespread disapproval of sport hunting among the young readership, even among rural residents. Attitudes were found to be more favorable toward hunting for food. The positive influences of engaging in certain wildlife-oriented activities, such as identifying birds, belonging to an animal club, and hunting was evident but children's behaviors toward wildlife more frequently took the form of fishing, watching wildlife programs on television, and going to the zoo.

Results are interpreted in terms of ways that educators and wildlife professionals can utilize young children's existing orientations to motivate a greater appreciation of wildlife. With expanding urbanization, management activities will need to accommodate growing humanistic and moralistic perceptions. Recommendations include gearing educational activities to the needs of specific demographic groups (younger children and urban residents), integrating materials into established school curricula, and increasing the quality and number of opportunities for both direct and indirect sources of contact with wildlife.

READEX FICHE

TABLE OF CONTENTS

		Page
Abstract		iii
Chapter 1:	Introduction	1
Chapter 2:	Methodology	5
Chapter 3:	Attitudes	15
Chapter 4:	Knowledge	33
Chapter 5:	Wildlife Preferences	39
Chapter 6:	Wildlife-Oriented Behaviors	45
Chapter 7:	Conclusions	63
Appendix 1:	Weekly Reader Reports on the Preliminary Results of the Wildlife Survey	69
Appendix 2:	Wildlife Survey Questionnaire	73
References		75

Chapter 1

INTRODUCTION

In 1983, the U.S. Fish and Wildlife Service published the last in a series of five reports which, collectively, represent the most comprehensive study of American attitudes toward wildlife ever undertaken. However, unlike the previous four reports which were national in scope, Children's Attitudes, Knowledge, and Behaviors Toward Animals (20) was based on personal interviews with 267 Connecticut schoolchildren from 7-17 years of age. Its broad purpose was to shed more light on the developmental stages of children's attitudes toward animals—their likes and dislikes, factors that influence their perceptions of animals, and what changes occur as they grow older.

The Connecticut study filled a void identified in an exhaustive review of the research literature at that time.[1] It was essentially a pilot study conducted for the purpose of developing a variety of techniques that could later be refined and adapted for use in measuring the attitudes of young people toward wildlife. The pilot study yielded rich and provocative data but the nagging question remained as to the generalizability of the data to schoolchildren across the country. Simply stated, were the kids in Connecticut typical kids?

At the same time the Connecticut pilot study was published, the Fish and Wildlife Service, like many other Federal agencies, was attempting to reduce its budget. Since there was no additional funding available to expand on the Connecticut findings, the Service responded to the challenge by entering into an informal cooperative agreement with the Weekly Reader staff at Xerox Educational Publications. Specifically, in exchange for designing a questionnaire tailored to young readers of Weekly Reader Eye and Senior Weekly Reader, the Service was able to analyze the results of over 15,000 questionnaires completed by fifth and sixth grade public school students in March 1983.

This study does not replicate the earlier pilot effort in Connecticut. The national questionnaire is different and considerably shorter than the pilot because of space limitations in the two Weekly Reader publications; items that did not gather meaningful information were dropped. Items were also selected that permited direct comparisons not only with children in the Connecticut study, but with adults included in the 1978 national survey

[1] Kellert and Westervelt (20) provided a comprehensive review of the research literature on children's attitude toward animals. The new articles that have appeared since that time are referred to in the present report. The conclusions drawn in the earlier review remain substantially the same, making a restatement of that literature review redundant.

of public attitudes toward wildlife (18). Moreover, the questions were carefully selected on the basis of their ability to provide meaningful data on a specific age group--10-12 year olds. Several authors suggest that, at this age, students are actively searching for more information about animals, their attitudes toward animals are still forming, and excellent opportunities exist for fostering an appreciation for the natural world (15, 21, 24, 37). The implications for environmental education are far reaching, a topic of discussion later in the report.

The report that follows is organized in the following manner:

- Chapter 2 provides a detailed discussion of the methodology used, how the national sample of children was obtained, how it compares with sociodemographic characteristics of the total U.S. population, the development of the questionnaire, the various types of information that were collected, procedures for data analysis, and finally, some specific comparisons of children's responses with those of adults.

- Chapter 3 begins with an in-depth look at four orientations toward animals derived from Kellert's attitude typology (18). Included are data on the humanistic, moralistic, naturalistic, and negativistic scales. Also included is a discussion of the incidence of these attitudes in children and adults.

- Chapter 4 follows the pattern established in the first two chapters by examining the extent of fifth and sixth graders' knowledge of animals, and then comparing these results with those of adults.

- Chapter 5 explores wildlife preferences, a topic of more than passing interest since such likes and dislikes among adults often appear to exert considerable influence on the acceptance or rejection of specific wildlife programs and policies (e.g., endangered species).

- Chapter 6 examines the findings concerning various wildlife-oriented behaviors, both consumptive and non-consumptive. Activities that are discussed in terms of popularity and frequency of participation include fishing, going to the zoo, birdwatching, hunting, etc. The results are further analyzed with respect to observed differences in schoolchildren depending on region of the country, area of residence (urban vs. rural), gender, attitude orientation, and knowledge of wildlife.

- Chapter 7 pulls the most important findings together in a set of conclusions and recommendations. Among the topics discussed are the implications of the results for wildlife management and environmental education programs, the diversity of children's perceptions about wildlife, the significance of a pervasive humanistic orientation toward animals, and the relative popularity of various activities--particularly the implications for public use management related initiatives.

The words of Aldo Leopold in A Sand County Almanac (22) address the real reason for doing this kind of study--the bequest value of wildlife

for future generations of Americans. Speculating about the kind of world his sons would encounter in the years ahead, Leopold observed:

> "I hope to leave them good health, and education, and possibly even a competence. But what are they going to do with these things if there are no more deer in the hills, and no more quail in the coverts? No more snipe whistling in the meadow, no more piping of widgeons and chattering of teal as darkness covers the marshes; no more whistling of swift wings when the morning star pales in the east? And when the dawn-wind stirs through the ancient cottonwoods, and the gray light steals from down the hills over the old river sliding softly past its wide brown sandbars--what if there be no more goose music?" (p.233)

Chapter 2

METHODOLOGY

The Sample

In March 1983, students across the United States were asked to complete a "Wildlife Survey" questionnaire developed in cooperation with Xerox Educational Publications. The questionnaire, described more fully in the next section, was published in March 13 issues of Weekly Reader Eye and Senior Weekly Reader. Collectively, these publications reach approximately 1,300,000 fifth and sixth grade public school students.

In the Teacher's Guides that accompanied these publications, teachers were asked to administer the survey to all students in their classes and to read these instructions out loud before starting: "Don't worry. This is not a test. Don't put your name on the paper. Just answer the questions as honestly as you can." It was hoped these instructions would counteract any effects of a testing atmosphere created by administering the survey in the classroom which could have hindered honest expressions of attitudes.

The teachers were also asked to record the overall responses of the whole class on the Tally Sheet provided, and to return the Tally Sheet along with the questionnaires completed by the students to Weekly Reader within two weeks. Some of the Tally Sheet results were then hand tabulated by Weekly Reader staff and reported in the May 6, 1983, issue (Appendix 1). It should be emphasized that data for the present study were not obtained from the Tally Sheets but from the individual questionnaires completed by the students themselves.

A sample of 3,156 questionnaires was drawn form the 15,787 that were returned.[1] Each of the 789 classes participating in the survey was represented by four randomly selected students. After deleting from the sample the 69 questionnaires completed by students who were not in the fifth or sixth grade, the total sample represented 3,087 fifth and sixth graders who receive Weekly Reader periodicals, primarily 10-12 years of age, and urban, suburban, and rural areas in 49 states.

---

[1] It should be noted that several teachers commented on their Tally Sheets that it was time consuming to fill them out. Although the perceived difficulty of this task would not affect the students actual responses, it could have affected the number of teachers choosing to participate in the survey. The fact that return postage could not be provided might also have discouraged the participation of some teachers. Also, distribution of the Wildlife Survey was controlled by Weekly Reader and precluded follow-up on nonrespondents.

The sociodemographic characteristics of the sample are compared with the total U.S. population of fifth and sixth graders in Table 1. (Teachers were asked to assist students with answering the demographic questions.) In general, there were more fifth than sixth graders, the proportion of children living in rural areas was relatively high, and the Northcentral and Rocky Mountain states were heavily represented—by Iowa, Kansas, Wisconsin, North Dakota, and South Dakota, in particular. The regional divisions (Figure 1) were the same as those in the 1978 national survey of public attitudes toward wildlife (18) which made regional comparisons between children and adults possible. Alaska was excluded from the present study due to a low response rate from that State. Information on race was not requested in accordance with the policy of Xerox Educational Publications.

The "Wildlife Survey" Questionnaire

The "Wildlife Survey" (Appendix 2) was a revised and abbreviated version of the questionnaire used in the 1983 pilot study of Connecticut children's attitudes, knowledge and behaviors toward animals (20). Forty-seven questions were carefully selected from the 203 questions in the pilot questionnaire based on their demonstrated ability to provide meaningful information about fifth graders perceptions of wildlife.

Attitude Questions

The 11 attitude items in the questionnaire represented the four attitude types that were most pervasive in fifth graders in the pilot study—humanistic, naturalistic, moralistic, and negativistic. The definitions of these attitudes in Table 2 were adapted from Kellert's 1980 attitude typology (18) to address the focus of this study.

Attitude scales were then constructed from the 11 attitude items to provide an objective means of measuring the presence and relative strengths of the four attitudes. Each scale consisted of three questions. There were five response alternatives for each question, ranging from "Strongly Agree" to "Strongly Disagree". A student's score on the humanistic scale, for example, could range from 3 (attitude weakly present) to 15 (attitude strongly present).

It should be noted here that the moralistic attitude scale focused exclusively on attitudes toward hunting. The moralistic scale in the pilot study of Connecticut children measured opinions on other issues as well, such as the treatment of animals in circuses and zoos, which were not covered in this study.

The independence of the attitude scales was determined through the correlation procedure of the Statistical Analysis System (SAS). In Table 3

TABLE 1

Sociodemographic Characteristics of Sample Compared to Fifth and Sixth Graders in the U.S.

		Sample (N=3087)	U.S. %[1] (N=6,923,000)
GRADE:	Fifth	60.9	50.7
	Sixth	39.1	49.3
AGE:	10	26.7	39.7
	11	49.2	43.4
	12	22.3	9.9
	Other	1.9	7.2
SEX	Male	48.4	50.7
	Female	51.6	49.3
RESIDENCE:	Urban	16.0 (50,000 or more)	26.4 (SMSA, central city, 50,000 or more)[2]
	Suburban	33.4 (6,000-50,000)	39.7 (SMSA, outside central city)
	Rural	50.6 (6,000 or less)	33.9 (Outside SMSA)

[1]U.S. Department of Commerce (34)

[2]A Standard Metropolitan Statistical Area (SMSA) is defined by the U.S. Bureau of Census as a county or group of contiguous counties which contains at least one central city of 50,000 inhabitants or more.

TABLE 1 (CONTINUED)

Sociodemographic Characteristics of Sample Compared to Fifth and Sixth Graders in the U.S.

		Sample %	U.S. %[1]
REGION:	Northcentral	37.04	23.91
	Illinois	5.73	4.58
	Indiana	2.66	2.51
	Iowa	4.18	1.25
	Kansas	5.64	1.00
	Michigan	3.89	4.27
	Minnesota	3.05	1.81
	Missouri	2.07	2.04
	Ohio	4.02	4.60
	Wisconsin	5.80	1.85
	Rocky Mountain	16.28	7.04
	Arizona	.55	1.31
	Colorado	1.68	1.42
	Idaho	1.43	.52
	Montana	1.56	.39
	Nebraska	4.57	.68
	Nevada	.13	.37
	New Mexico	.52	.62
	North Dakota	2.69	.29
	South Dakota	2.24	.31
	Utah	.52	.88
	Wyoming	.39	.25
	Pacific	9.16	13.65
	California	6.25	10.07
	Hawaii	0	.39
	Oregon	1.42	1.22
	Washington	1.49	1.97
	Alaska	0	.23

[1]U.S Department of Education (35)

TABLE 1 (CONTINUED)

Sociodemographic Characteristics of Sample Compared to Fifth and Sixth Graders in the U.S.

		Sample %	U.S. %[1]
REGION:	Northeast	16.95	18.91
	Connecticut	.65	1.25
	Maine	.78	.56
	Massachusetts	.91	2.47
	New Hampshire	.39	.43
	New Jersey	2.56	2.74
	New York	5.60	6.50
	Pennsylvania	5.54	4.36
	Rhode Island	.13	.35
	Vermont	.39	.25
	South	20.50	36.11
	Alabama	.49	1.90
	Arkansas	1.04	1.11
	Delaware	.13	.20
	District of Columbia	.29	.22
	Florida	2.20	3.93
	Georgia	1.17	2.75
	Kentucky	1.30	1.69
	Louisiana	.26	1.95
	Maryland	.75	1.70
	Mississippi	.68	1.28
	North Carolina	2.01	2.88
	Oklahoma	1.68	1.49
	South Carolina	1.43	1.62
	Tennessee	.97	2.18
	Texas	3.50	7.70
	Virginia	1.56	2.56
	West Virginia	1.04	.95

[1]U.S. Department of Education (35)

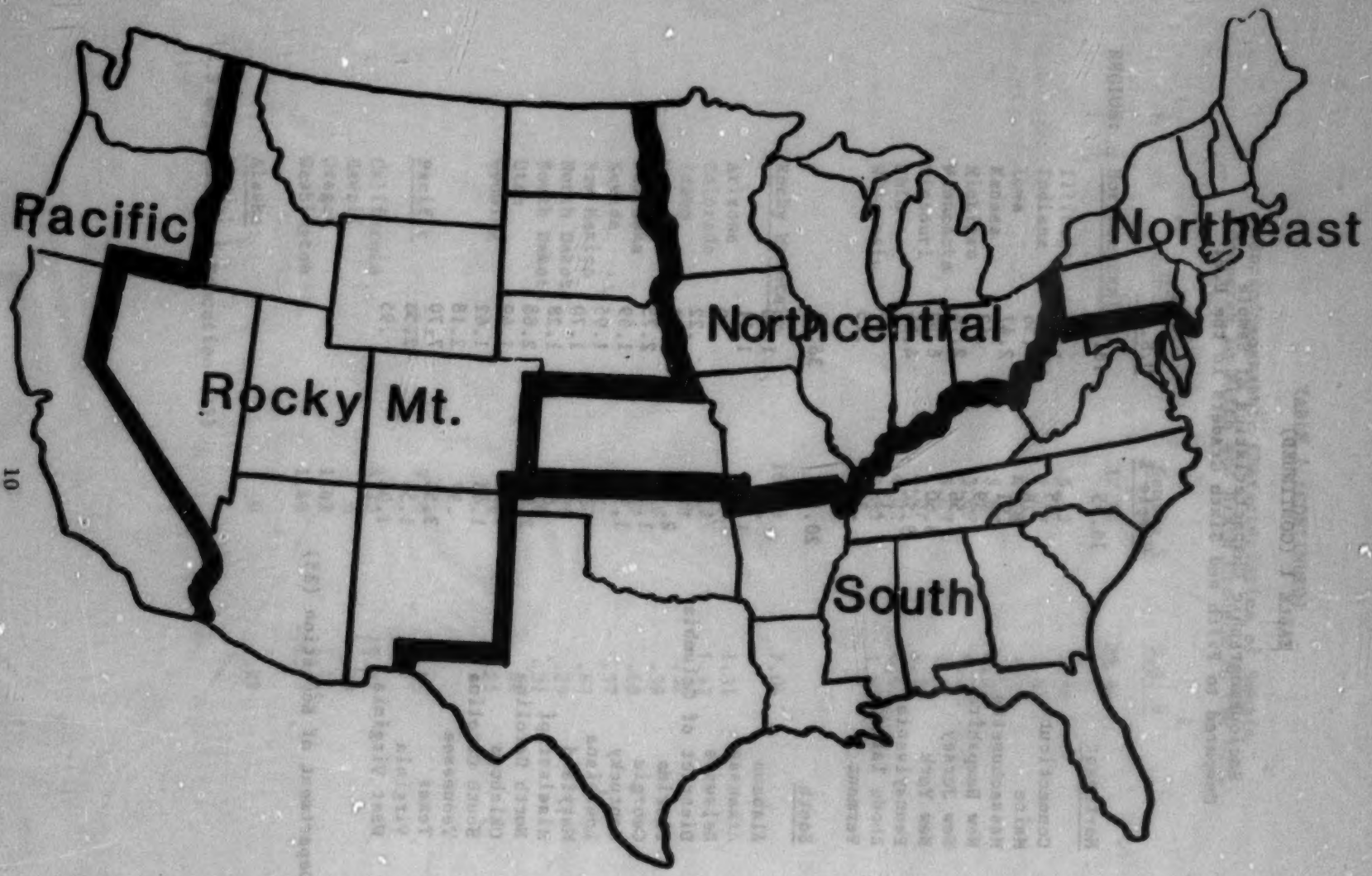


Figure 1. Regional Divisions of the United States

TABLE 2

Attitudes Toward Animals[1]

HUMANISTIC:	An emotional identification with individual animals, mainly pets, combined with strong anthropomorphic tendencies.
MORALISTIC:	A strong concern for the right and wrong treatment of animals, expressed in this study as attitudes toward hunting.
NATURALISTIC:	A strong attraction to wildlife and the outdoors.
NEGATIVISTIC:	An orientation directed away from wild animals due to fear or dislike.

[1]Adapted from Kellert and Berry (18)

TABLE 3

Attitude Scale Correlation Matrix

PEARSON-R CORRELATION COEFFICIENTS
(SIGNIFICANCE PROBABILITY)

	HUMANISTIC	MORALISTIC	NATURALISTIC
MORALISTIC	.2276* (.0001)		
NATURALISTIC	-.0990* (.0001)	.0555 (.0001)	
NEGATIVISTIC	.0971* (.0001)	-.0386 (.0325)	-.4255* (.0002)

*Correlations equal to or exceeding ±.10 were accepted.

are listed the Pearson-r coefficients of correlation between the scales. They range from .23 to -.43, indicating the uniquely different orientations toward animals expressed by young people today. The largest positive correlation of .23, between the humanistic and moralistic scales, indicates a relationship between their emotional identification with individual animals and unfavorable opinions about hunting, which was recently suggested by Pomerantz (27). The largest negative correlation, between the naturalistic and negativistic scales, demonstrates the ability of the scales to distinguish between a child's basic inclination to approach or avoid wild animals in general.

Knowledge Questions

Six true/false questions were asked about the behavioral and physical characteristics of wild animals, and four multiple-choice questions addressed the foods that wild animals eat. Correct answers were scored 10, and incorrect ones were scored 0. (To discourage guessing on the true/false questions, students were told that "Don't Know" answers were better than wrong answers. These "Don't Know" responses were given a score of three.) Individual scores on the animal knowledge scale, therefore, could range from 0-100.

Wildlife Preferences

Predators, nonpredators, "big" and "small" mammals and birds--13 species in all, with some falling in more than one category--were selected for this scale because of indications that young people may base their preferences for wild animals on size and predatory-nonpredatory characteristics (7, 20, 28). Eleven animals were used in the pilot study's animal preference scale, and the mouse and rabbit were added to equate the number of animals in the four categories. Unlike the pilot study, only wild animals comprised this scale. Individual scores for each animal, and for the whole wildlife preference scale, could range from 1 (Really Like) to 5 (Really Dislike).

Wildlife-Oriented Behaviors

Twelve questions were asked about frequency of participation in these activities—hunting, fishing, birdwatching, identifying birds, zoo visitation, learning about animals in school, animal club membership, and watching wildlife television shows. Previous research suggests some interesting relationships between these behaviors, attitudes, and knowledge (21, 26).

Data Analysis

Standard programs of the Statistical Analysis System (SAS) were used to analyze the data. The PROC FREQ program and its respective subprograms were used to generate descriptive statistics of the sample, a complete list

of the coded responses of each student, and cross-tabulations of frequencies and percentages of demographic groups. PROC ANOVA was used to test the relationships between demographic variables, attitude orientations, knowledge levels, and behavior groups. The matrix of Pearson-r coefficients of correlation between the scales was generated by the PROC CORR procedure.

Comparing Young People and Adults

A separate data set was constructed from the responses of the students in this study and the adults in the 1978 national survey of public attitudes toward wildlife and natural habitat (18). The responses of children and adults to 33 equivalent attitude, knowledge, and wildlife preference questions were then compared using the PROC FREQ and PROC ANOVA procedures of the Statistical Analysis System (SAS). Adult responses to behavior questions were excluded due to discrepancies in the wording of questions in the two surveys.

Not all questions in the "Wildlife Survey" had also been asked of the adults in the 1978 survey. For example, only two of the three questions comprising the children's humanistic scale had been asked of adults. This accounts for the shorter range of humanistic scores used to compare children with adults, i.e., 2-10 instead of 3-15. Similarly, the range of negativistic scores comparing children and adults was also modified to 2-10. The wildlife preference scale consisted of only 11 items--two items fewer than the scale used to compare groups of children only. Six questions were used to compare the knowledge scores of children and adults, and the value of a correct knowledge response was increased from 10 to 16 to create a maximum possible score near 100.

For the purpose of this analysis, the "Don't Know" and "No Answer" responses of children were scored the same way as in the adult survey, that is, as missing values. This manipulation accounts for the difference between the attitude and knowledge scores of children compared to other children and the scores of children compared to adults.

An inherent problem with comparing children and adults was the different wording of attitude questions. The earlier pretests (18) revealed that several attitude items in the adult questionnaire needed to be revised because of consistent difficulties they experienced with certain words and concepts. In one or two cases the changes were relatively severe and the reader may question if the two separate attitude items measured the same attitude. Regarding general orientations toward wildlife, as measured by attitude scales consisting of several attitude items, the comparisons between children and adults were more direct.

Chapter 3

ATTITUDES

Humanistic

An emotional identification with individual animals was the most commonly expressed attitude among respondents (Table 4). The humanistic scale had the highest percentage of scores falling in the high scoring range, the highest overall mean score, and the lowest standard deviation.

The wide prevalence of this attitude among the young readers was indicated by the 90% who disagreed that "Love is a feeling people should have only for other people, not for animals," and the majority preference for loveable kinds of animals (Table 5). Although children are more likely to ascribe human traits to pets than to wild animals (5, 14), 43% of the sample were certain wild animals "get lonely in the wilderness."

Humanistic scores were high for all demographic groups, but females and urban residents scored particularly high (Table 6). Another indication of how prevelent humanistic tendencies are was the equally high scores obtained by all five geographic regions of the country.

Moralistic

It was surprising to find this attitude ranking second (Table 4), due to its narrow focus—hunting. As seen in Table 4, more children obtained the highest possible score of 15 on this scale than on all others.

Seventy-nine percent of the total sample disapproved of hunting for sport, 58% of which disapproved strongly (Table 7). Hunting for food was more acceptable although almost as many respondents (42%) opposed the activity as supported it (46%). Consistent with these findings were the results to a similar question which showed that 59% opposed hunting whales for food.

While it was instructive to learn that most of the young respondents were opposed to sport hunting, perhaps more relevant was the fact that they differentiated between hunting for food and hunting for sport. This finding has been reported in even younger children (20).

Not surprisingly, demographic differences in attitudes toward hunting reflected the likelihood of the group to participate in the activity (see Chapter 4), with females, urban residents, and children living in the Pacific Coast states being the most opposed (Table 8).

TABLE 4

Attitude Scale Frequency Distributions and Mean Scores

Score	Humanistic %	Moralistic %	Naturalistic %	Negativistic %
LOW				
1	0	.1	0	.1
2	0	.1	0	.7
3	.6	.7	.6	7.6
4	.1	1.3	.6	9.9
5	.9	2.1	6.1	11.5
6	.4	3.3	8.8	12.0
7	2.0	5.3	12.5	14.1
	4.0	14.0	29.0	56.0
MEDIUM				
8	2.9	9.2	9.7	13.0
9	13.3	11.6	17.4	9.0
10	13.0	10.0	10.8	9.5
	29.2	30.8	37.9	31.5
HIGH				
11	18.3	12.5	12.0	6.3
12	19.4	14.0	8.2	3.0
13	16.4	8.1	8.4	1.9
14	8.7	8.6	3.2	1.1
15	4.0	12.5	1.7	.2
	66.8	55.7	33.5	12.5
STANDARD DEVIATION:	2.07	2.90	2.59	2.71
RANGE OF SCORES:	3-15	3-15	3-15	3-15
MEAN SCORE:	11.25	10.76	9.27	7.21

TABLE 5

Humanistic Questions

		Percent of Sample	
1. What kind of animals do you like most?			
	Loveable animals	56.04%	
	Animals that live in the woods	20.20	
	Beautiful animals	9.15	
	Useful animals	4.47	
	Other	9.23	
2. Love is a feeling people should have only for other people, not for animals.			
	Strongly agree	2.87	
	Agree	4.15	7%
	Disagree	19.06	
	Strongly disagree	70.79	90%
3. Wild animals get lonely in the wilderness.			
	Strongly agree	17.02	
	Agree	25.77	43%
	Disagree	21.15	
	Strongly disagree	9.73	31%

TABLE 6[1]

Humanistic Scores
Demographic Groups

	MEAN SCORE[2]	F VALUE	SIG. F
TOTAL SAMPLE	11.25		
SEX			
Male	10.75(a)		
Female	11.83(a)	235.34	.0001
RESIDENCE			
Urban	11.53(b)		
Suburban	11.29		
Rural	11.24(b)	3.99	.0186
REGION			
Pacific	11.11		
Rocky Mountain	11.09		
Northcentral	11.26		
South	11.40		
New England	11.27	2.01	n.s

[1]Scores could range from 3-15.

[2]Mean scores followed by the same letter in parens are significantly different from each other.

TABLE 7

Moralistic Questions

		Percent of Sample	
1. Hunting wild animals for sport is okay.			
	Strongly agree	4.48%	
	Agree	10.07	15%
	Disagree	21.10	
	Strongly Disagree	57.50	79%
2. Hunting wild animals for food is okay.			
	Strongly agree	11.03	
	Agree	34.81	46%
	Disagree	18.82	
	Strongly disagree	23.51	42%
3. It's okay to hunt whales for food as long as there are a lot of them left in the world.			
	Strongly agree	9.56	
	Agree	22.45	32%
	Disagree	17.81	
	Strongly disagree	41.47	59%

TABLE 8

Moralistic Scores[1]
Demographic Groups

	MEAN SCORE[2]	F VALUE	SIG. F
TOTAL SAMPLE	10.76		
SEX			
Male	10.25(a)		
Female	11.28(a)	98.32	.0001
RESIDENCE			
Urban	11.21(b)		
Suburban	11.03 (c)		
Rural	10.49(b)(c)	16.71	.0001
REGION			
Pacific	11.21(d)		
Rocky Mountain	10.66		
Northcentral	10.59(d)		
South	10.92		
New England	10.80	3.36	.0095

[1]Scores could range from 3-15.

[2]Mean scores followed by the same letter in parens are significantly different from each other.

Naturalistic

Strong interest in wildlife was third in popularity, indicating a moderate level of naturalistic appreciation in this age group (Table 4). Almost half of the sample said they would prefer to camp near wild animals, 38% would not say they liked pets more, and 20% preferred animals in the woods over lovable kinds of animals (Table 9). Keeping in mind the predominance of the humanistic orientation, these figures represent sizeable groups of children who lean more strongly toward wildlife. The low negative correlation found between the naturalistic and humanistic attitudes (Table 3) indicates that an emotional identification with individual animals and an interest in wildlife are very different orientations in young people.

Among the demographic groups, boys and rural residents were the most naturalistic, and children living in the South distinguished themselves from other regions as the least wildlife-oriented (Table 10).

Negativistic

Fear and avoidance of animals was the least frequently expressed attitude (Table 4). It had the lowest mean score and very few children scored in the high range. Only 9% said they didn't like animals near them (Table 11). Over half believed that wild animals are not dangerous. Fear of snakes, however, was reported by 42% of the sample.

The strongest regional differences were noted on the negativistic scale, with the South showing higher negativistic scores than all other regions (Table 12). Among residential areas, urban children were the most fearful, and girls were much more afraid of animals than were boys—of snakes, in particular.

The Attitudes of Children and Adults

In this section, the results of the children's Wildlife Survey are compared with the results obtained from the 1978 national survey of adult attitudes toward wildlife and natural habitat (18).

Sentimental affection for loveable kinds of animals was also the most prevalent attitude in adults, but the humanistic scores of young people were even higher (Figure 2, Table 13).

Regarding the development of the humanistic attitude, there is evidence that it remains strong from childhood to the twenties, but begins to decline from then on (18, 20). This trend is depicted in Figure 3. What

TABLE 9

	Percent of Sample	
Naturalistic Questions[1]		
1. What animals do you like most?		
Animals that live in the woods	20.20%	
Loveable animals	56.04	
Beautiful animals	9.15	
Useful animals	4.47	
Other	9.23	
2. If I were to go camping, I would want to stay where lots of other people were, not where wild animals were around.		
Strongly agree	17.06	
Agree	25.62	43%
Disagree	23.63	
Strongly disagree	24.16	48%
3. I like pet animals such as dogs and cats more than I like wild animals.		
Strongly agree	17.69	
Agree	26.69	45%
Disagree	25.62	
Strongly disagree	12.27	38%

TABLE 10

Naturalistic Scores[1]
Demographic Groups

	MEAN SCORE[2]	F VALUE	SIG. F
TOTAL SAMPLE	9.27		
SEX			
Male	9.86(a)		
Female	8.79(a)	134.87	.0001
RESIDENCE			
Urban	8.89(b)		
Suburban	9.18 (c)		
Rural	9.53(b)(c)	14.17	.0001
REGION			
Pacific	9.32		
Rocky Mountain	9.42(d)		
Northcentral	9.37 (e)		
South	8.63(d)(e)(f)		
New England	9.40 (f)	5.92	.0001

[1]Scores could range from 3-15.

[2]Mean scores followed by the same letter in parens are significantly different from each other.

TABLE 11

Negativistic Questions

1. Most wild animals are dangerous to people.			
	Strongly agree	9.41%	
	Agree	26.55	36%
	Disagree	32.50	
	Strongly disagree	20.21	53%
2. I don't like most animals near me.			
	Strongly agree	2.93	
	Agree	5.86	9%
	Disagree	28.02	
	Strongly disagree	57.82	86%
3. I would be scared to touch a snake.			
	Strongly agree	24.46	
	Agree	17.79	42%
	Disagree	24.29	
	Strongly disagree	24.25	49%

TABLE 12

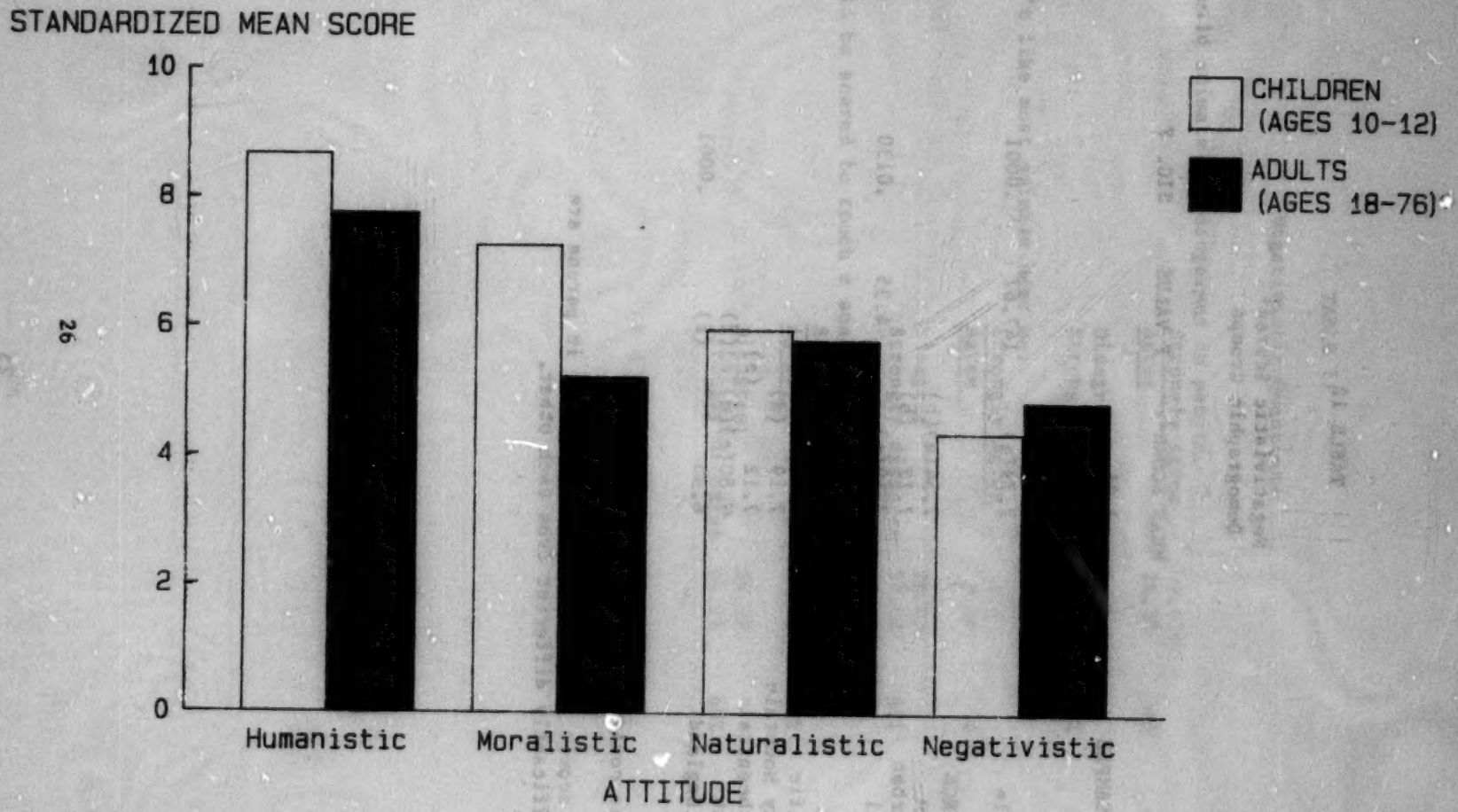
Negativistic Scores[1]
Demographic Groups

	MEAN SCORE[2]	F VALUE	SIG. F
TOTAL SAMPLE	7.21		
SEX			
Male	6.62(a)		
Female	7.79(a)	147.67	.0001
RESIDENCE			
Urban	7.54(a)(b)		
Suburban	7.12 (b)		
Rural	7.19(a)	4.35	.0130
REGION			
Pacific	6.91(c)		
Rocky Mountain	7.19 (d)		
Northcentral	7.12 (e)		
South	7.80(c)(d)(e)(f)		
New England	6.90 (f)		.0001

[1]Scores could range from 3-15.

[2]Mean scores followed by the same letter in parens are significantly different from each other.

Figure 2
Attitude Differences Between Children and Adults



Differences between children and adults on each attitude are significant at the $p<.005$ level.

TABLE 13

Children and Adults:

Humanistic Questions and Scores[1]

	MEAN SCORE[2]	STANDARD DEVIATION	F VALUE	SIG. F
TOTAL SAMPLE	8.26			
CHILDREN	8.68(a)	1.73		
ADULTS	7.76(a)	1.69	381.79	.0001

	PERCENT OF CHILDREN	PERCENT OF ADULTS	χ^2 VALUE	SIG. χ^2
1. What animals do you like most?[3]				
Loveable animals/Attractive and likable animals[4]	56.04	31.65		
Other	43.95	68.35	321.193	.0001
2. Love is a feeling people should have only for other people, not for animals.[3] I think love is an emotion which people should feel only for other people, not for animals.[4]				
Agree	7.25	13.18		
Disagree	92.75	86.72	506.11	.0001

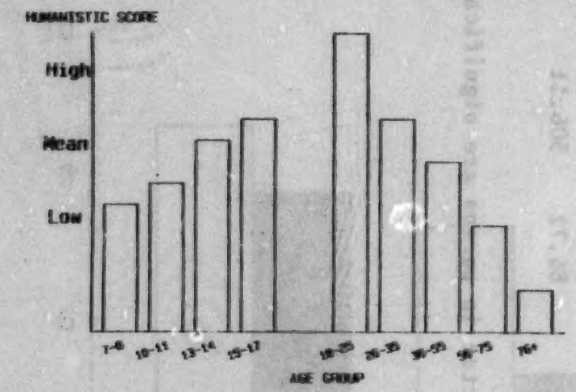
[1]Scores could range from 2-10

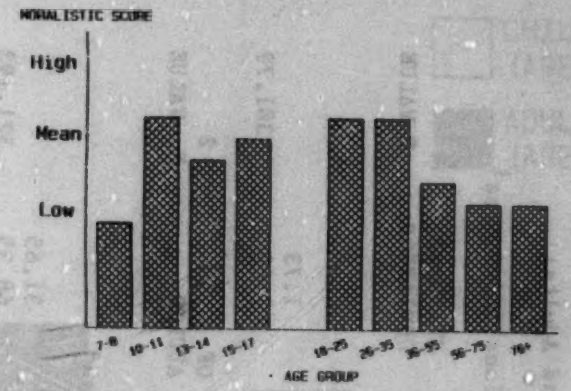
[2]Mean scores followed by the same letter in parens are significantly different.

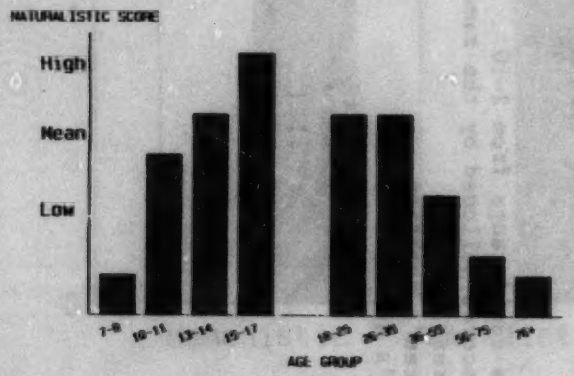
[3]Children's question

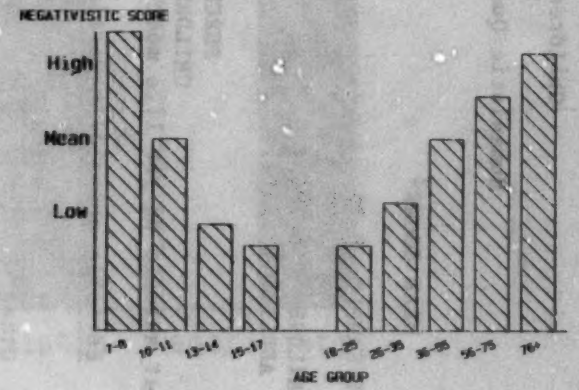
[4]Adult's question

Figure 3
Attitude Development:
Maturational Changes in Children and Adults









Differences among children and adults on each attitude (except children's humanistic scores) are significant at the $p<.01$ level.

Children's data from Kellert & Westervelt, 1983
Adult data from Kellert & Berry, 1980

has not been determined is whether this phenomenon is a function of maturation, that is, as people grow older they become less humanistic, or a reflection of a recent societal change in the way Americans regard animals. Urbanization also could be involved in view of evidence that the humanistic attitude has markedly increased in urban areas since 1900 (19).

Anti-hunting sentiment was also less evident in adults (Figure 2). Regardless of the purpose of the hunt, adults were more approving (Table 14). The two age groups differed the most in their opinions about hunting whales for food--88% of adults and only 35% of children approved.

Previous findings provide some insight into how attitudes toward hunting develop and they emphasize the importance of distinguishing between the different reasons that people hunt. Regarding attitudes toward sport hunting, the stage of transition appears to be during the three years prior to the fifth grade (ages 8-10), when opinions become negative and remain so into young adulthood. Later, in the three years following the fifth grade (ages 11-13), attitudes about hunting for food become more positive, and they remained that way through adulthood.

Naturalistic scale results revealed that adults were less interested in wildlife, but the difference between the two groups was not great (Figure 2, Table 15). The biggest contrast was between the 53% of children and only 37% of adults who said they would rather camp where wild animals were around.

In the Connecticut study, interest in wildlife increased with age and peaked in the senior high school years (ages 15-17) (Figure 3). In the 1978 survey of adults, naturalistic leanings were strongest from ages 18 to 25 and they continually declined afterwards. Like the changes in attitudes toward hunting, these transitions in naturalistic appreciation deserve serious consideration in terms of trends and future demands on resources.

Both age groups scored low on the negativistic scale and did not mind having most animals (except the snake) near them (Figure 2, Table 16). Adults scored higher on this scale, but not to a great extent. The difference between the two groups as depicted in Figure 2 does not illustrate the drastic changes found to take place as children and adults grow older, as seen in Figure 3. Second graders (ages 7-8) were found to be extremely fearful of animals, scoring highest of all demographic groups in the Connecticut study (20). With age, childhood fears dissipated, but after age 25, the 1980 national survey reported that negativistic expressions increased (18). It is interesting to note that these transitional stages mirror those of the naturalistic attitude described above.

TABLE 14

Children and Adults:
Moralistic Questions and Scores[1]

	MEAN SCORE[2]	STANDARD DEVIATION	F VALUE	SIG. F
TOTAL SAMPLE	9.45			
CHILDREN	10.90(a)	3.93		
ADULTS	7.84(a)	2.93	967.01	.0001

		PERCENT OF		2 X VALUE	2 SIG. X
		CHILDREN	ADULTS		
1.	It's okay to hunt whales for food as long as there are alot of them left in the world.[3] I think it's all right to kill whales for a useful product as long as the animals are not threatened with extinction.[4]				
	Agree	35.07	78.79		
	Disagree	64.94	21.21	1327.641	.0001
2.	Hunting wild animals for food is okay.[3] Do you approve of or oppose hunting for meat?[4]				
	Agree	51.99	86.16		
	Disagree	48.02	13.83	763.727	.0001
3.	Hunting wild animals for sport is okay.[3] Do you approve of or oppose hunting for recreation and sport?[4]				
	Agree	15.60	38.60		
	Disagree	84.40	61.40	886.013	.0001

[1]Scores could range from 3-15.
[2]Mean scores followed by the same letter in parens are significantly different.
[3]Children's question
[4]Adult's question

TABLE 15

Children and Adults:
Naturalistic Questions and Scores[1]

	MEAN SCORE[2]	STANDARD DEVIATION	F VALUE	SIG. F
TOTAL SAMPLE	8.84			
CHILDREN	8.96(a)	3.13		
ADULTS	8.71(a)	3.18	7.67	.0056

	PERCENT OF CHILDREN	PERCENT OF ADULTS	X^2 VALUE	SIG. X
1. What animals do you like most?				
Animals in the woods[3]	20.20	17.31		
Animals[4]	79.79	81.69	72.99	.0001
Other				
2. I like pet animals such as dogs and cats more than I like wild animals.[3] I am generally more interested in pet animals than wild animals.[4]				
Agree	54.10	56.75		
Disagree	45.90	43.25	109.907	.0001
3. If I were to go camping, I would want to stay where lots of other people were, not where wild animals were around.[3] If I were to go camping, I would prefer staying in a modern campground than in an isolated spot where there might be wild animals around.[4]				
Agree	47.18	62.87		
Disagree	52.83	37.13	154.808	.0001

[1]Scores could range from 3-15.
[2]Mean scores followed by the same letter in parens are significantly different.
[3]Children's question [4]Adult's question

TABLE 16

Children and Adults:
Negativistic Questions and Scores[1]

	MEAN SCORE [2]	STANDARD DEVIATION	F VALUE	SIG.F
TOTAL SAMPLE	4.60			
CHILDREN	4.37(a)	2.16		
ADULTS	4.86(b)	2.46	59.66	.0001

		PERCENT		X^2 VALUE	SIG. X^2
		CHILDREN	ADULTS		
1. I would be scared to touch a snake.[3] I would be afraid to touch a snake.[4]					
	Agree	46.53	39.84		
	Disagree	53.47	60.16	166.174	.0001
2. I don't like most animals near me. [3,4]					
	Agree	9.29	23.25		
	Disagree	90.71	76.75	736.129	.0001

[1] Scores could range from 2-10.
[2] Mean scores followed by the same letter in parens are significantly different.
[3] Children's question
[4] Adult's question

Chapter 4

KNOWLEDGE

The average score on the knowledge quiz was 64 (on a scale of 0-100), indicating a moderate level of factual understanding about the physical and behavioral characteristics of wild animals (Table 17). Facts about the foods wild animals eat and the more common animals, such as spiders and birds, were familiar to students but questions about how animals are classified and what trout eat were more difficult (Table 18). Most children thought snakes are covered with slime--a fairly popular misunderstanding among many snake-fearing Americans.

Gender and geographic region were major demographic influences, with females and children living in the South demonstrating the least knowledge (Table 17).

Not surprisingly, knowledge was positively associated with naturalistic interests, and knowledge and fears of animals were negatively related (Table 19). Although a causative relationship between knowledge and attitudes was not demonstrated, the negative correlation between interest and fears of animals reported in the previous chapter suggests the value of dispelling fears about animals before an interest in learning more about wildlife can develop.

Knowledge of Children and Adults

The similar scores obtained by children and adults demonstrated equally unimpressive levels of knowledge about wildlife (Table 20). The two age groups did score very differently on almost all individual knowledge items, however. Children knew more about birds and spiders. Adults knew more about classifying animals and were less likely to believe snakes are covered with slime.

Based on evidence that the greatest increase in factual knowledge of animals occurs between the fifth and eighth grades (20) there is a possibility that a sample of older children would have scored higher than the adults, implying that either young people today are smarter about animals than adults or as people get older they forget the facts about animals they learned as children.

TABLE 17

Knowledge Scores[1]
Demographic Groups

	MEAN SCORE[2]	F VALUE	SIG. F
TOTAL SAMPLE	64.26		
GENDER			
Male	66.76(a)		
Female	61.89(a)	68.35	.0001
RESIDENCE			
Urban	62.98		
Suburban	64.66		
Rural	64.40	1.88	n.s.
REGION			
Pacific	65.13		
Rocky Mountain	65.21(a)		
Northcentral	63.85		
South	61.87(a)(b)		
New England	64.96 (b)	4.25	.0020

[1] Scores could range from 0-100.

[2] Mean scores followed by the same letter in parens are significantly different.

TABLE 18
Knowledge Questions

		% Correct
1.	What food does a rabbit eat most of the time? (Plants, Mice, or Nuts)	
2.	What food does a wolf eat most of the time? (Deer, Berries, or Grass)	86.78
3.	What food does an owl eat most of the time? (Seeds, Mice, or Foxes)	85.97
4.	Spiders have ten legs. (False)	83.34
5.	All adult birds have feathers. (True)	73.34
6.	Most insects have backbones. (False)	57.37
7.	What food does a trout eat most of the time? (Seaweed, Lily pads, or Flies)	50.10
8.	Koalas are not really bears. (True)	46.91
9.	Snakes have a thin covering of slime in order to move more easily. (False)	31.29
10.	Inchworms are in the same family of animals as earthworms. (False)	15.99

TABLE 19

Relationships Between Attitude and Knowledge Score of Total Sample

	PEARSON R CORRELATION COEFFICIENT (SIGNIFICANCE LEVEL)
	KNOWLEDGE
NATURALISTIC	.21546* (.0001)
NEGATIVISTIC	-.23353* (.0001)
MORALISTIC	.02629 (n.s.)
HUMANISTIC	-.04910 (n.s.)

*Correlations exceeding ±.10 were accepted.

TABLE 20

Children and Adults:
Knowledge Questions and Scores[1]

	MEAN SCORE	STANDARD DEVIATION	F VALUE	SIG. F
TOTAL SAMPLE	46.83			
CHILDREN	47.58	32.64		
ADULTS	45.91	40.89	2.84	.0922

	PERCENT CORRECT: CHILDREN	ADULTS	X^2 VALUE	SIG. X^2
1. Spiders have ten legs. (False)	83.34	49.82	701.554	.0001
2. All adult birds have feathers. (True)	73.34	62.94	67.761	.0001
3. Koalas are not really bears. (True)	36.49	42.08	17.676	.0001
4. Snakes have a thin covering of slime in order to move more easily. (False)	31.29	51.77	235.143	.0001
5. Inchworms are in the same family of animals as earthworms. (False)	15.99	23.39	47.339	.0001
6. Most insects have backbones. (False)	57.37	57.18	.021	.8859

[1]Scores could range from 0-96.

Chapter 5

WILDLIFE PREFERENCES

Respondents to the Wildlife Survey had a high regard for wild animals in general (Table 21). Gender and geographic region were related to their wildlife preferences, with males and children living in Pacific Coast states liking the majority of wildlife species the most (Table 22). Children were attracted to the species and general categories of animals discussed below.

The rabbit was the most favorite, which is likely a result of its pet-like image. Children have consistently ranked pets higher than wild animals (2, 10, 20), and have cited the rabbit as the wild animal they would most like to be (6). Also, "soft" and "pretty," obvious characteristics of the rabbit, are qualities of animals children this age are the most attracted to (20). Another distinction of the rabbit was that it was the only animal liked by more girls than boys.

The other animals ranking in the top 25% of the scale between "Really Like" (1) and "Like" (2) were birds--the eagle and robin. Earlier results with a semantic differential scale indicated that young people, regardless of age, are particularly fond of the eagle because it is "pretty," "interesting," and smart (20).

Seven animals ranked in the second quarter of the scale, with mean scores between "Like" (2) and "Not Sure" (3). The highest rank in this group was held by another bird--the owl--followed by six very large mammals--the bear, elephant, walrus, moose, coyote, and wolf. The wolf's mean score, which was very close to the "Not Sure" (3) response and had a high standard deviation, suggests the coexistence of strongly-held positive and negative feelings about this animal. Previous research based on a content analysis of public comment on the proposed reclassification of the Eastern timber wolf tends to support this assumption (23).

The lowest ranking animals were the mouse, skunk, and rat--animals usually connected with scaring or harming people. The mean scores of these animals need to be considered also, because they fell closer to the "Not Sure" response (3) than to "Really Don't Like" (5) which indicates the regard children have for even unpopular animals.

The reasons why children favored some wild animals over others was explored by dividing the 13 animals into categories found to influence the preferences of children in Connecticut (20)--predators (e.g., coyote), nonpredators (e.g., elephant), big animals (e.g., moose), and small animals (e.g., rabbit). Small animals ranked lowest (Table 23), supporting earlier evidence that large animals are preferred by children of all ages.

TABLE 21

Wildlife Preferences[1]

RANK	ANIMAL	MEAN SCORE	STANDARD DEVIATION
	Most Favored:		
1	Rabbit	1.37	.62
2	Eagle	1.67	1.03
3	Robin	1.73	.90
	Moderately Favored:		
4	Owl	2.22	1.11
5	Bear	2.23	1.30
6	Elephant	2.30	1.29
7	Walrus	2.40	1.20
8	Moose	2.54	1.18
9	Coyote	2.81	1.26
10	Wolf	2.86	1.42
	Least Favored:		
11	Mouse	3.06	1.42
12	Skunk	3.80	1.41
13	Rat	3.91	1.32
OVERALL MEAN SCORE=		2.53	.72

[1]Scores could range from 1=Really Like to 5=Really Don't Like.

TABLE 22

Wildlife Preferences[1]
Demographic Groups

	MEAN SCORE[2]	F VALUE	SIG. F
TOTAL SAMPLE	2.53		
GENDER			
Male	2.41(a)		
Female	2.65(a)	80.98	.0001
RESIDENCE			
Urban	2.56		
Suburban	2.49		
Rural	2.55	3.17	.0421
REGION			
Pacific	2.37(a)(b)(c)		
Rocky Mountain	2.53(a)		
Northcentral	2.54 (b)		
South	2.64 (c)(d)		
New England	2.46 (d)	8.44	.0001

[1]Scores could range from 1=Really Like to 5=Really Dislike.

[2]Mean scores followed by the same letter in parens are significantly different.

TABLE 23

Wildlife Categories

RANK	CATEGORY	MEAN SCORE[1]
1	Nonpredatory	2.30
	Moose	
	Elephant	
	Mouse	
	Rabbit	
2	Big	2.33
	Wolf	
	Bear	
	Eagle	
	Moose	
	Walrus	
	Elephant	
3	Predatory	2.36
	Coyote	
	Wolf	
	Bear	
	Owl	
	Eagle	
4	Small	2.78
	Rat	
	Skunk	
	Mouse	
	Rabbit	
	Robin	

[1]Scores could range from 1=Really Like to 5=Really Dislike.

Differences between the nonpredator, big, and predator mean scores were not great.

Wildlife Preferences of Children and Adults

The fifth and sixth graders liked wild animals in general more, and they also liked specific animals more than adults did, except for the elephant, walrus, moose, and skunk (Table 24). The children's perceptions of predators were also more positive. The reasons for this difference would be an interesting subject for further investigation, particularly in light of earlier findings that perceptions of predators become more positive as children today mature (20).

TABLE 24

Wildlife Preferences
Children and Adults

ALL ANIMALS:		MEAN SCORE	STANDARD DEVIATION	F VALUE	SIG. F
Children		2.60	1.11		
Adults		2.66	.87	4.34	.0372
SPECIFIC ANIMALS:	RANK				
Eagle					
Children	1	1.67	1.03		
Adults	2	1.96	.85	125.19	.0001
Robin					
Children	2	1.73	.90		
Adults	1	1.81	.68	14.58	.0001
Owl					
Children	3	2.22	1.11		
Adults	4	2.20	.86	.93	n.s.
Bear					
Children	4	2.23	1.30		
Adults	7	2.37	.97	19.84	.0001
Elephant					
Children	5	2.30	1.29		
Adults	3	2.18	.80	15.64	.0001
Walrus					
Children	6	2.40	1.20		
Adults	6	2.33	.86	5.81	.0159
Moose					
Children	7	2.54	1.18		
Adults	5	2.28	.84	83.92	.0001
Coyote					
Children	8	2.81	1.26		
Adults	9	3.00	1.07	35.01	.0001
Wolf					
Children	9	2.86	1.42		
Adults	8	2.98	1.16	12.22	.0005
Skunk					
Children	10	3.80	1.41		
Adults	10	3.26	1.21	226.95	.0001
Rat					
Children	11	3.91	1.32		
Adults	11	4.43	.81	286.91	.0001
WILDLIFE CATEGORY:					
Predators					
Children		2.37	1.16		
Adults		2.53	.93	32.43	.0001

Chapter 6

WILDLIFE-ORIENTED BEHAVIORS

Popular Behaviors

The most popular wildlife-oriented activity was fishing, reported by an impressive 76% of the sample (Table 25). Demographically, boys and children living in rural areas were the most likely to participate in this activity as well as many others (Tables 26-27). Young people living in the Northcentral and Rocky Mountain states reported the most fishing, and they also had the highest level of participation in the two other consumptive wildlife activities--hunting and having a father who hunts (Table 28).

Watching television shows about wildlife and going to the zoo were also very popular. Zoo visitation was the only activity reported by more urban residents who, without direct access to wildlife, obviously made good use of their nearby zoos.

Having a father who hunts was also reported frequently. Discussed later in this chapter is this activity's relationship to children's attitudes and behaviors.

Moderately Popular Behaviors

Moderately popular behaviors, reported by 25-50% of the sample, were school activities involving animals, birdwatching, and hunting. Birdwatching was defined for the respondents as "going outside or taking a trip just to see or identify birds." "Little young ladies in Nikes" might be a fitting description for the birdwatchers in this study since most of those reporting this activity were girls. In fact, birdwatching and going to the zoo were the only activities in which more girls than boys participated.

The 27% of the sample who went hunting closely resembled the anglers in demographic composition--boys, rural residents, and those living in the Rocky Mountain and Northcentral states. As consumptive wildlife activities, the greater popularity of fishing among these groups was not surprising due to the greater accessibility of fishing opportunities. In this regard, it is interesting to reflect on the finding that children this age are more likely to attribute the sense of pain to mammals than to fish (27). A relationship between hunting and having a father who hunts was indicated--87% of young hunters had fathers who also hunted, and most of those with hunting fathers who did not hunt themselves were girls.

TABLE 25

Wildlife-Oriented Behaviors[1]

	PERCENT (N) OF SAMPLE	
Frequent Behaviors:[2]		
Fishing	76.10%	(2286)
Frequent watching of television shows about wildlife	61.95	(1851)
Going to the zoo	57.90	(1737)
Have a father who hunts	54.92	(1652)
Moderately Frequent Behaviors:[3]		
Keeping live animals in class	39.78	(1199)
Doing school experiments about animals	39.45	(1176)
Going on class trip to learn about animals	31.37	(943)
Birdwatching	29.10	(883)
Hunting	27.11	(824)
Least Frequent Behaviors:[4]		
Belonging to animal club	10.21	(307)
Using a bird book while birdwatching	9.36	(289)
(percent of birdwatchers)	(32.73)	(289)
Can identify more than 30 kinds of birds	6.51	(188)

[1]All behaviors, except having a father who hunted in the past five years, were participated in during the previous year's time.

[2]More than 50% of sample [3]25-50% of sample [4]Less than 25% of sample

TABLE 26

Behaviors with Differences Between Genders

	PERCENT OF TOTAL MALES	FEMALES	X^2 VALUE	SIG.X^2
Fishing	85.32	67.44	127.548	.0001
Frequently watching wildlife television shows	71.66	52.56	112.952	.0001
Father went hunting	58.26	51.67	12.798	.0003
Going to the zoo	55.20	59.91	6.590	.0103
Hunting	41.91	12.27	331.228	.0001
Birdwatching	26.84	31.20	6.770	.0093
Can identify more than 30 kinds of birds	10.06	3.20	84.385	.0001

TABLE 27

Behaviors With Differences Between
Areas of Residence

	PERCENT OF TOTAL URBAN	SUBURBAN	RURAL	X^2 VALUE	SIG.X^2
Fishing	72.09	2.35	79.64	22.211	.0001
Frequently watching wildlife television shows	56.26	62.15	63.61	26.043	.0001
Going to zoo	71.31	60.85	51.49	63.796	.0001
Father goes hunting	32.55	44.78	68.93	256.720	.0001
Going on class trip to learn about animals	34.18	38.06	25.99	42.686	.0001
Hunting	17.05	18.66	35.91	120.555	.0001
Using a bird book while birdwatching	7.69	3.44	1.67	11.529	.0031
(% of birdwatchers)	3.59	35.15	25.70		
Belonging to animal club	7.53	8.64	12.08	12.144	.0023

TABLE 28

Behaviors with Differences Between Regions

PERCENT OF TOTAL

	PACIFIC	ROCKY MT.	NORTH CENTRAL	SOUTH	NORTH EAST	X2 VALUE	X2 SIG.
Fishing	72.99	77.34	79.11	74.15	72.08	13.234	.0102
Father goes hunting	32.73	69.58	60.02	52.27	44.81	130.978	.0001
Keeping live animals in classroom	38.41	46.61	38.28	36.36	41.33	14.267	.0065
Going on class trips to see animals	38.15	25.82	30.45	29.55	37.60	23.275	.0001
Birdwatching	26.98	22.95	29.58	31.14	32.62	14.002	.0073
Hunting	17.45	38.37	31.07	23.43	17.05	84.126	.0001
Using a bird book while birdwatching	15.08	5.24	2.6[illegible]	4.15	6.76	10.028	.0400
(% of birdwatching)	42.67	26.32	30.77	26.22	35.33		

Although methodological differences preclude direct comparisons of the actual number of young hunters in the U.S., the present figure of 27% resembles reports of the number of teenagers who hunt (21, 26, 30). The fact that hunting was not defined for the pre-adolescents in this study could have inflated the present figure because looking for animals like frogs or insects could have been considered a form of hunting, as it was by children in the pilot study (20).

Least Popular Behaviors

The least popular behaviors, reported by less than 25% of the sample, all required a greater level of commitment to learning about animals--belonging to an animal club, using a bird book while birdwatching, and identifying numerous species of birds.

That most animal club members were rural residents does not imply that the clubs were exclusively livestock-related; indeed this behavior group also scored exceptionally high on naturalistic interests. In addition, it is interesting to note that the number of youths participating in 4-H wildlife projects tripled in the last 15 years (16).

Only 7% of the sample reported the ability to identify more than 30 kinds of birds; however, this figure represents a sizeable number of young people who possess such skills. The same proportion of adults reported the same ability (17).

The Attitudes and Knowledge of Behavior Groups

Fishing, hunting, and the expressed ability to identify more than 30 kinds of birds were related in identical ways to all four attitudes and knowledge (Table 29). They were positively associated with knowledge and appreciation of wildlife, and negatively related to sentimental affection for individual animals, fear of wild animals, and opposition to hunting. This finding, along with the similiar demographic makeup of hunters and anglers, would suggest considerable overlap between these groups. In terms of total numbers, the biggest overlap was the hunting/fishing group (Figures 4a-4c). Figures 4a-4c show that most children who fished did not hunt or birdwatch, but engaging in various combinations of all three behaviors was characteristic of birdwatchers and hunters.

Birdwatching was the only behavior that was positively related to all four attitudes (its negative relationship with the negativistic attitude reflecting a positive orientation to wildlife). No other behavior was positively related to the humanistic attitude. In the following paragraphs it will be important to note the different knowledge and attitudinal chacteristics of birdwatchers and bird-identifers. To children, as with adults, "birdwatching" connotes vastly different levels of enthusiasm,

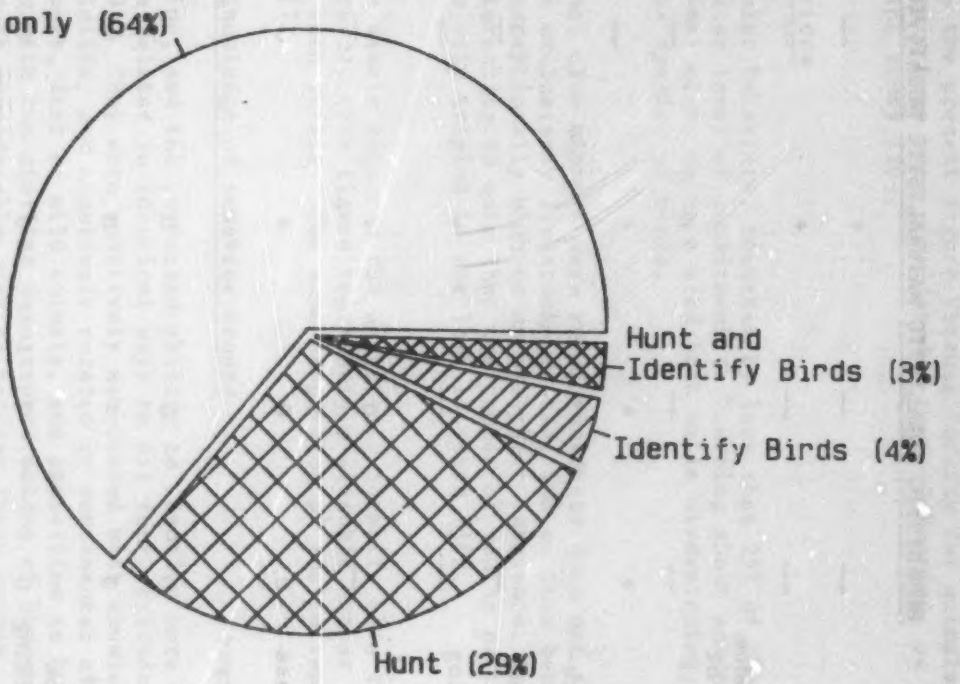
TABLE 29

RELATIONSHIPS[1] BETWEEN WILDLIFE-RELATED BEHAVIORS, ATTITUDES, AND KNOWLEDGE

	HUMANISTIC	MORALISTIC	NATURALISTIC	NEGATIVISTIC	KNOWLEDGE
Fishing	—	—	+	—	+
Hunting	—	—	+	—	+
Can identify more than 30 kinds of birds	—	—	+	—	+
Birdwatching	+	+	+	—	0
Freqently watching wildlife television shows	—	0	+	—	+
Dad goes hunting	—	—	+	—	0
Belonging to animal club	—	0	+	—	0
Keeping live animals in class	0	0	+	0	+
Doing class experiments about animals	0	0	0	—	+
Going to zoo	0	+	0	0	0
Using bird book while birdwatching	0	0	0	0	0
Going on school trip to learn about animals	0	0	0	0	0

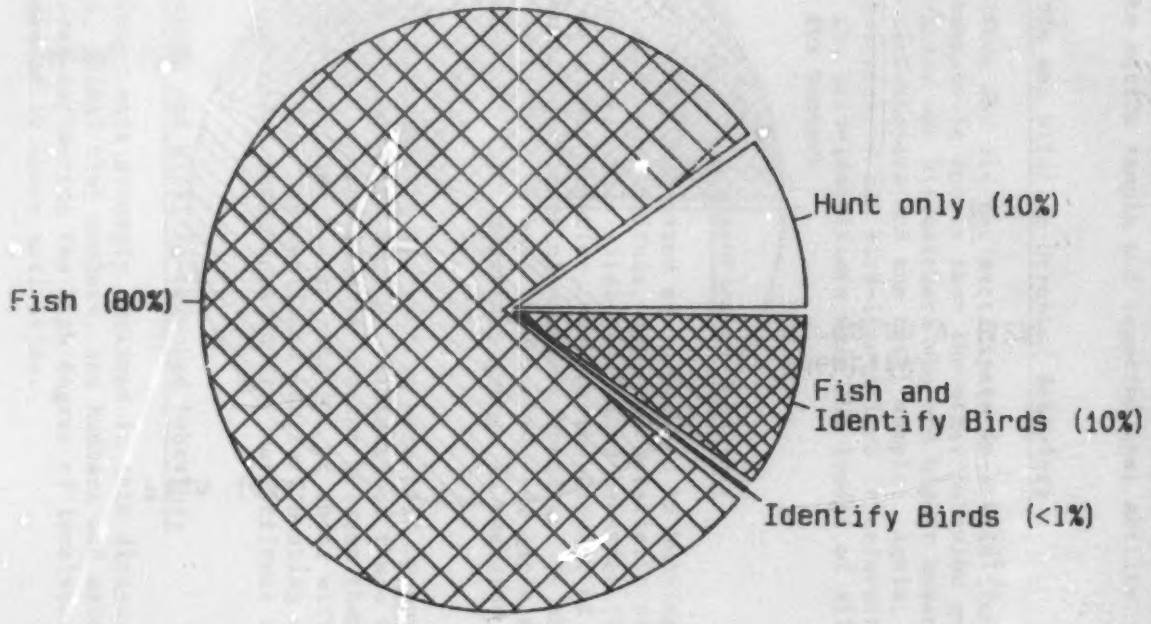
[1] + = Positive relationship significant beyond .05 level of confidence
- = Negative relationship
0 = No significant relationship

Figure 4a
Anglers: Percent of Overlap With Hunters And Bird Identifiers



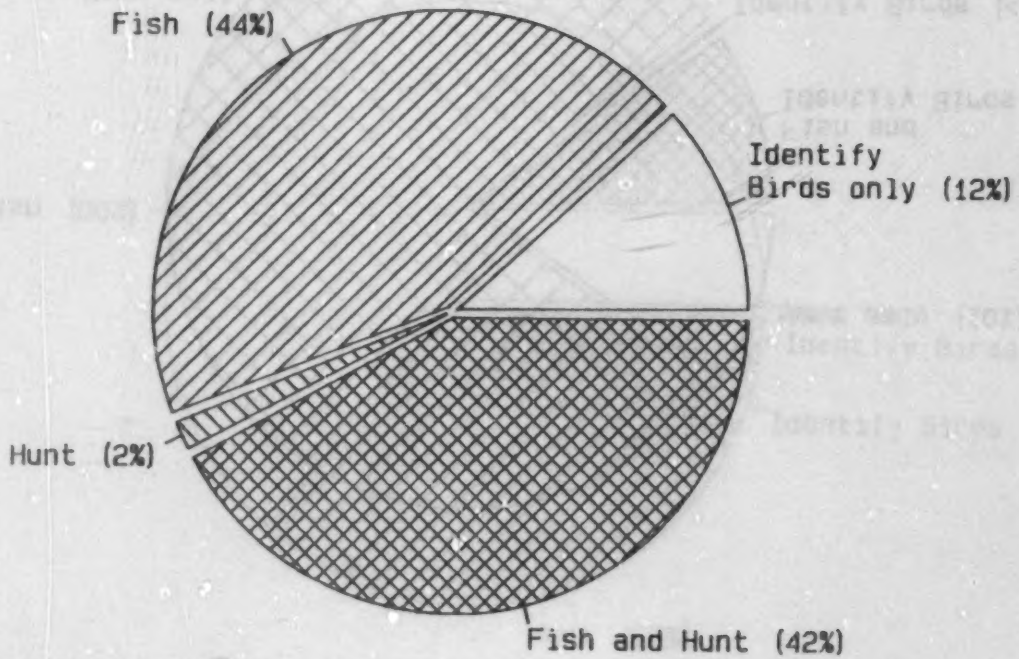
ANGLERS (N=2286)

Figure 4b
Hunters: Percent of Overlap With Anglers and Bird Identifiers



HUNTERS (N=824)

Figure 4c
Bird Identifiers: Percent of Overlap With Anglers and Hunters



BIRD IDENTIFIERS (N=188)

commitment, and interest in birds since most young birdwatchers did not use bird books and could not identify many birds (Figure 5). The percentage of young birdwatchers who could identify more than 30 birds was basically the same percentage of the entire sample who reported that ability.

The Humanistic Attitude and Wildlife-Oriented Behaviors

In general, children who did not participate in a wildlife-oriented activity had higher humanistic scores than the other behavior groups (Table 30). The exception was birdwatchers who had higher humanistic scores than both non-birdwatchers and the total sample. Again, the difference between birdwatchers and bird-identifiers is noteworthy—the humanistic scores of the bird-identifiers were the lowest of all behavior groups, identical to the hunters.

The Moralistic Attitude and Wildlife-Oriented Behaviors

The moralistic attitude, expressed as opposition to hunting in this study, was, like the humanistic attitude, more characteristic of respondents who did not engage in a wildlife-related behavior (Table 31). Birdwatchers, again, were the exception, ranking the highest of all activity groups in their negative opinions about hunting. It should be recalled here that more girls than boys birdwatched, and girls also had the highest moralistic scores of all demographic groups in the study.

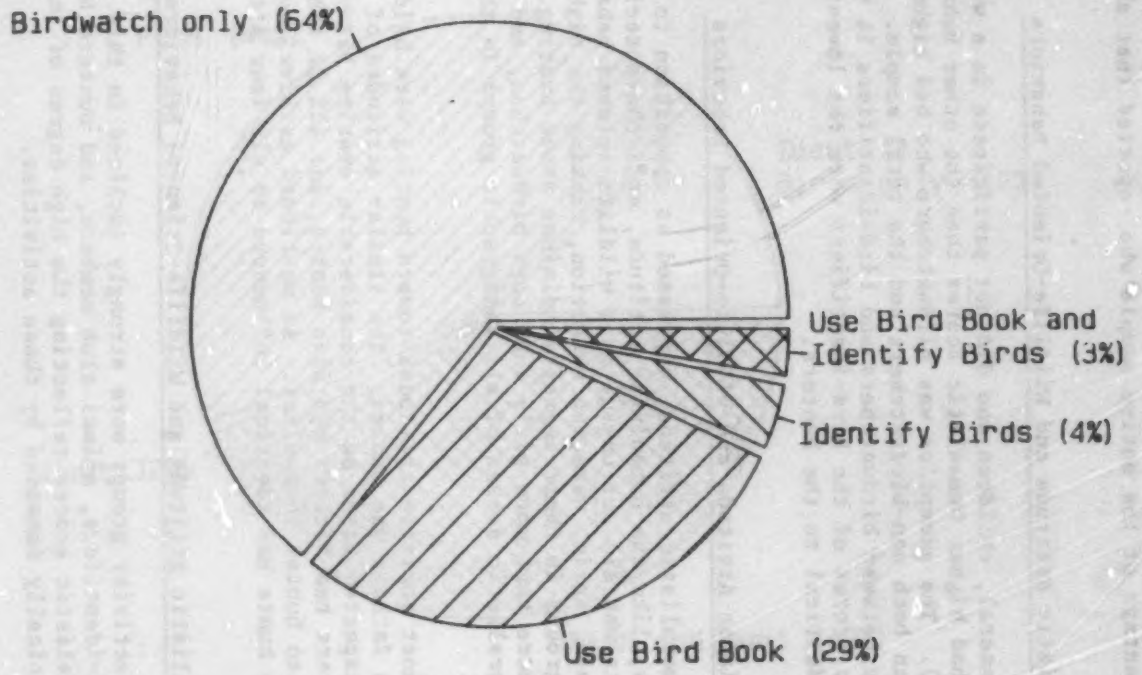
The most positive attitudes toward hunting were held by hunters and those with fathers who hunted. The similar attitudes of these two groups would be expected based on the considerable overlap between them—87% of young hunters had fathers who also hunted, and 43% of those with hunting fathers also hunted themselves. As mentioned earlier, hunting and having a father who hunts had identical influences on all four attitude orientations.

The Naturalistic Attitude and Wildlife-Oriented Behaviors

Most activity groups were strongly inclined in this direction (Table 32). Bird-identifers, animal club members, and hunters had exceptionally high naturalistic scores reflecting the high degree of involvement with animals typically demanded by those activities.

The high-scoring animal club members deserve mention because they ranked highest in naturalistic leanings in the Connecticut study (20). This was a small activity group consisting mainly of rural children.

Figure 5
Percent of Birdwatchers
Who Identify Birds And/Or Use A Bird Book



BIRDWATCHERS (N=883)

TABLE 30

Humanistic Attitude Scores
Behavior and Non-Behavior Groups

MEAN SCORE OF TOTAL SAMPLE = 11.34

	MEAN SCORE[1] OF THOSE ANSWERING YES	NO	F VALUE	SIG. F
Birdwatching	11.48	11.28	6.33	.0119*
Fishing	11.25	11.64	20.58	.0001*
Watching wildlife television shows				
5+ times (Frequent Viewers)	11.24(a)			
1-5 Times		11.57(a)		
Never		11.30	8.19	.0003*
Dad goes hunting	11.23	11.47	10.54	.0012*
Belonging to animal club	10.97	11.38	11.24	.0008*
Can identify birds				
More than 30 kinds	10.70(a)(b)			
20-30 kinds		11.16(b)		
Less than 20 kinds		11.41(a)	12.40	.0001*
Hunting	10.70	11.58	113.59	.0001*
Going to zoo	11.36	11.31	.47	n.s.
Using a birdbook while birdwatching	11.34	11.40	.20	n.s.
Keeping live animal in classroom	11.33	11.34	.02	n.s.
Doing school experiment about animals	11.32	11.35	.20	n.s.
Going on school trip to learn about animals	11.32	11.35	.11	n.s.

[1]Mean scores of multiple choice answers (i.e., not Yes or No) that are followed by the same letter in parens differ significantly.

*Behavior and non-behavior groups differ significantly.

TABLE 31

Moralistic Attitude Scores
Behavior and Non-Behavior Groups

SCORE OT TOTAL SAMPLE = 10.82

	MEAN SCORE[1] OF THOSE ANSWERING YES	NO	F VALUE	SIG. F
Birdwatching	11.11	10.70	12.85	.0003*
Going to zoo	10.91	10.70	4.20	.0406*
Fishing	10.65	11.39	36.75	.0001*
Can identify birds				
More than 30 kinds	10.40			
20-30 kinds		10.31(a)		
Less than 30 kinds		10.93(a)	9.12	.0001*
Dad goes hunting	10.27	11.50	138.45	.0001*
Hunting	9.52	11.31	237.20	.0001*
Using a bird book while birdwatching	11.26	10.95	2.33	n.s.
Belonging to animal club	10.97	10.80	1.13	n.s.
Going on class trip to learn about animals	10.95	10.77	2.74	n.s.
Doing class experiment about animals	10.89	10.78	.98	n.s.
Watching wildlife television shows				
More than 5 times	10.82			
1-5 times		10.88		
Never		10.82	.72	n.s.
Keeping live animal in classroom	10.74	10.88	1.74	n.s.

[1]Mean scores of multiple choice answers (i.e., not Yes or No) that are followed by the same letter in parens differ significantly.

*Behavior and non-behavior groups differ significantly.

TABLE 32

Naturalistic Attitudes Scores
Behavior and Non-Behavior Groups

SCORE OF TOTAL SAMPLE = 9.35

	MEAN SCORE [1] OF THOSE ANSWERING YES	NO	F VALUE	SIG. F
Can identify birds				
More than 30 kinds	10.46(a)(b)			
20-30 kinds		10.03(b)		
Less than 20 kinds		9.17(a)	36.10	.0001*
Belonging to animal club	10.10	9.27	28.69	.0001*
Hunting	10.03	9.10	80.40	.0001*
Watching wildlife television shows				
More than 5 times	9.73(a)			
1-5 time		8.83(a)		
Never		8.26(a)	61.60	.0001*
Birdwatching	9.64	9.23	16.22	.0001*
Dad goes hunting	9.56	9.10	24.36	.0001*
Keeping live animal in classroom	9.50	9.26	6.37	.0117*
Fishing	9.49	8.91	27.37	.0001*
Using a bird book while birdwatching	9.70	9.52	1.05	.3068
Doing a class experiment about animals	9.40	9.32	.82	.3646
Going to zoo	9.32	9.39	.51	.4768
Going on class trip to learn about animals	9.27	9.40	1.90	.1686

[1]Mean scores of multiple choice answers (i.e., not Yes or No) that are followed by the same letter in parens differ significantly.

*Behavior and non-behavior groups differ significantly.

Further examination of the young hunters revealed that those who were also bird-identifers had higher naturalistic scores ($\bar{X}$ 11.33) than those who were not ($\bar{X}$ 9.40, F= 43.9ℓ, p<.0001).

The high naturalistic scores of viewers of wildlife television shows such as Wild Kingdom, Jacques Cousteau, and National Geographic Specials on Animals, was particularly reassuring in light of the popularity of this activity.

The Negativistic Attitude and Wildlife-Oriented Behaviors

Most groups scored lower than the sample mean, and the nonbehavior groups expressed far more fear of wild animals than the behavior groups (Table 33). The bird identifiers distinguished themselves on this attitude, too, indicating the least fear of all behavior and deomographic groups.

Curiously, the most fearful group was those who had not watched a television show about wildlife within the past year.

Knowledge and Wildlife-Oriented Behaviors

The bird-identifiers demonstrated the most factual knowledge of wildlife (Table 34). High knowledge scores were also characteristic of frequent watchers of wildlife television shows. In fact, children who had not watched a wildlife television show during the previous year had the lowest knowledge scores of all behavior and demographic groups. Although these results cannot demonstrate a direct cause-and-effect relationship between participation in wildlife activities and knowledge, there is evidence of the importance of wildlife television shows as a meaningful source of wildlife knowledge for children (11).

Regarding zoo visitation, "educational benefit to children" was the most frequently cited reason by adults for going to the zoo in the 1980 national survey (17), but the present results do not reveal such a relationship.

TABLE 33

Negativistic Attitude Scores
Behavior and Non-behavior Groups

MEAN SCORE OF TOTAL SAMPLE= 7.20

	MEAN SCORE[1] OF THOSE ANSWERING YES	NO	F VALUE	SIG. F
Dad goes hunting	7.05	7.38	10.71	.0011*
Fishing	7.01	7.82	48.60	.0011*
Doing class experiment about animals	7.01	7.32	9.28	.0023*
Birdwatching	6.99	7.29	7.87	.0051*
Watching wildlife television shows				
More than 5 times	6.82(a)			
1-5 times		7.71(a)		
Never		8.29(a)	54.64	.0001*
Belonging to animal club	6.67	7.26	13.13	.0003*
Hunting	6.52	7.45	71.17	.0001*
Can identify birds				
More than 30 kinds	6.18(a)			
20-30 kinds		6.25(b)		
Less than 20 kinds		7.40(a)(b)	41.92	.0001*
Going to zoo	7.19	7.21	.07	n.s.
Going on class trip to learn about animals	7.09	7.25	2.16	n.s.
Keeping live animal in classroom	7.08	7.27	3.65	n.s.
Using bird book while birdwatching	6.89	7.07	.92	n.s.

[1]Mean scores of multiple choice answers (i.e., not Yes or No) that are followed by the same letter in parens differ significantly.

*Behavior and non-behavior groups differ significantly.

TABLE 34

Knowledge Scores
Behavior and Non-behavior Groups

MEAN SCORE OF TOTAL SAMPLE= 64.26

	MEAN SCORE[1] OF THOSE ANSWERING YES	NO	F VALUE	SIG. F
Can identify birds				
More than 30 kinds	68.85(a)			
20-30 kinds		65.58		
Less than 20 kinds		64.37	6.197	.0010*
Watching wildlife television shows				
More than 5 times	66.49(a)			
1-5 times		62.96(a)		
Never		58.28(a)	34.55	.0001*
Hunting	66.37	64.20	10.27	.0014*
Doing class experiment about animals	65.85	64.12	7.85	.0051*
Keeping live animal in classroom	65.73	64.20	6.14	.0133*
Fishing	65.27	63.24	8.15	.0044*
Belonging to animal club	66.39	64.62	3.11	n.s.
Dad goes hunting	65.21	64.28	2.30	n.s.
Birdwatching	65.19	64.63	.73	n.s.
Using a bird book while birdwatching	65.18	64.63	.22	n.s.
Going to zoo	65.09	64.38	1.33	n.s.
Going on class trip to learn about animals	64.83	64.78	.00	n.s.

[1]Mean scores of multiple choice responses (i.e., not Yes or No) that are followed by the same letter in parens differ significantly.

*Behavior and non-behavior groups differ significantly.

Chapter 7

CONCLUSIONS

How young Americans relate to wildlife is a rich field of study with important implications for a wide variety of professional interests from endangered species management to child development. The focus of this discussion will be the meaning of the study to natural resource managers and environmental educators whose efforts can directly benefit from the findings.

At this point, it seems prudent to again remind the reader of some of the limitations associated with the sampling procedure that we were compelled to use in this study. The fundamental question is the extent to to which a sample of fifth and sixth graders receiving Weekly Reader periodicals is representative of all fifth and sixth graders across the United States. We noted earlier, for example, that the North Central and Rocky Mountain states were over represented in contrast to the South, which was under represented. Similarly, rural schoolchildren were more heavily represented than urban respondents. Clearly, these factors may have influenced the results. Nonetheless, historically, consumptive use of wildlife among the adult U.S. populations occurs more frequently in these two geographic regions and in rural communities. Thus, some of the disadvantages inherent in our sample are counterbalanced by the absence of a pronounced urban orientation in respondent attitudes.

Patterns of geographic distribution aside, questions can also be raised about the characteristics of school systems that subscribe to Weekly Reader periodicals versus those that do not. This is an issue of no small concern; however, there is no available empirical evidence to suggest a systematic bias operating in this situation. Likewise, why some teachers chose to return questionnaires while others did not is open to speculation. In some cases, instructions may have been misinterpreted; in others, the cost of return postage may have been a deterrent; in still others, the desire to retain the information for further classroom use could have influenced teacher decisions. Unfortunately, we do not know the answers to these questions, and any attempt to gather data on such issues would be costly and exceed our legal authority to do so. In summary, the authors must restate the obvious: the sampling procedure employed in this study did not preclude the possibility of bias and caution is advised regarding generalizations to children nationally.

Utilize Humanistic Trends

In general, it can be concluded that the perceptions of the children in this study toward wildlife were extremely diverse. The wildlife orientations of any one group of children were as different as those of

adults, and demographic factors--particularly gender and urban/rural differences--had equally profound effects over their opinions, knowledge, and behaviors. The predominance of the humanistic attitude toward animals in American society exerts considerable influence over the views of these young people, but there was also a remarkably large group of children who were strongly oriented toward wildlife in a naturalistic way.

The popularity of the humanistic attitude in the children in this study signifies a major challenge to wildlife professionals. The humanistic orientation exerted a powerful and pervasive influence that knew no regional boundaries and seemed to be unaffected by how knowledgeable the children were about wildlife. Previous research has identified the pervasiveness of this attitude among adults, also (18). Management activities may need to take into account a growing humanistic orientation that emphasizes the importance of individual animals and attractive species. If we are indeed witnessing a contemporary trend toward increased humanization, as the research suggests, this challenge to wildlife programs will become even more real as society becomes more urbanized and more young people and females assume policy-making positions.

There are several ways to view the humanistic trend in a positive sense. Creative teaching strategies can be developed that use this basic humanistic orientation toward animals to stimulate interest in wildlife and help young people identify with the natural world. Supplemented with objective information about how wildlife, people, and the environment relate to each other, a broader base of knowledge can be instilled--one that emphasizes sound ecological principles without challenging strongly-held humanistic perceptions. Children under 12 relate to animals and the world in general in very egocentric, anthropomorphic ways (3, 4, 25, 31). In order for them to understand a concept such as ecological interdependence, therefore, it should be related to what they feel, objects they see, or phenomena they directly experience. In this way, anthropomorphic understandings of why animals behave the way they do should be utilized to achieve these broader conceptual understandings of the environment.

Using this positive humanistic approach, the learning process can also get started at ages earlier than do most environmental education programs about conservation, pollution, and ecology. Unfortunately, involvement in environmental education programs is currently lowest in the early elementary grades and highest in grades 11 and 12 (9) when orientations toward wildlife are already well established. Whereas environmental education typically occurs in high school biology or geology class (9), it also can take place earlier in a variety of other contexts. Because elementary school curricula are rigorously structured around the development of basic skills, wildlife education materials that can be integrated into traditional subject areas may have more lasting impact than half-hour presentations, films, or supplementary education packets. As

Hamilton (12) states, "Students can learn to calcuate wildlife populations from data in math class as well as they can learn to add or multiply apples and baseballs. In the process they will indirectly learn some of the realities of wildlife population dynamics. Writing poems or songs about a favorite animal or tree can accomplish the requirements of a language arts or music class while subtly teaching appreciation and understanding of the resource." (p. 249)

Hunting: The Value of a Historical Perspective

Like the prevalence of humanistic sentiment, widespread concern about sport hunting among the young people in this survey also signifies a very real challenge that needs to be recognized. There are two important factors to consider in meeting this challenge--young people clearly distinguish between hunting for food and hunting for sport and, whereas opinions about food hunting may become more positive as they mature, their negative attitudes about sport hunting are established before they reach their teens. In a recent analysis of research on public attitudes toward hunting (19), it was concluded "The American public is slowly shedding some of its traditional support of hunting activities." (p.48) The current findings suggest the pace may quicken in the near future.

Balanced and objective information will become more valuable to education programs that address hunting. To avoid endangering the effectiveness of a wildlife education program with controversy over hunting, a learning atmosphere can be created with gathering information on the number of Americans who enjoy hunting, the main reasons they hunt, and how and why these numbers and reasons have changed in American history. Students can then reach their own conclusions based on the objective facts they gathered.

Future studies on children's attitude toward hunting might consider using non-categorical scaling techniques such as the psychophysical magnitude scales used effectively by Bammel (1) to measure hunting attitudes of adults. The value of these magnitude scales is that they are created by the rater, they produce ratios, have inherent validity, and parametric statistics are appropriate. The present authors also strongly recommend that hunting be carefully defined for respondents under the age of 15 to increase the accuracy of numbers of young hunters and to examine the reasons behind the noted differences in children's opinions about hunting for food and sport.

Fuel Naturalistic Interests At Younger Ages

Although naturalistic appreciation for wildlife was not as common humanistic sentiments, there was a sizeable number of children in this study who clearly preferred wild animals over pets, derived great enjoyment from being near wildlife outdoors, and engaged in activities that required

direct involvement with wildlife. If we assume adults are less wildlife-oriented because of a recent societal trend and not because of a maturational phenomenon, chances are that naturalistic interests will become more common and the demand to satisfy them will intensify. Keeping in mind the characteristics of the children in this survey, that future may look even more likely in light of earlier evidence that wildlife interests increase as children grow older (20). The opposing influence of expanding urbanization, however, will make it important for wildlife programs to reach more and more children. As this growing group of urban children come to rely more heavily on indirect sources of wildlife contact, such as wildlife television shows, books, schools, and zoos, the accuracy and objectivity of the information they receive will become more crucial. Some of the more valuable opportunities that urban areas can provide, in terms of influencing wildlife knowledge and attitudes, are identifying birds, belonging to an animal club, watching wildlife television shows, and birdwatching. As Shaw and Mangum (32) have noted, agencies interested in stimulating opportunities for non-consumptive wildlife activities would do well to put more emphasis on urban-based initiatives.

The inverse relationships found throughout the study between the naturalistic and negativistic attitudes suggest a need to allay children's fears of animals before an interest in wildlife can develop. Three demographic groups--females, urban residents, and those living in the South--demonstrated consistently low naturalistic and high negativistic scores, indicating a need for more wildlife education programs targeted at these specific populations.

Develop Conceptual Understandings At Younger Ages

Before drawing gloomy conclusions about the equally low knowledge levels of both young and adult Americans, we must consider the Connecticut study's report of a large gain in knowledge level after the grades levels examined here, that is, between the fifth and eighth grades. Naturalistic interests also increased later on between the eighth and eleventh grades. Further study of older children might yield somewhat different results with more positive implications for the future.

Conclusions about the knowledge results should also consider the type of knowledge that was measured, that is, factual knowledge about very specific characteristics of particular animals. There is evidence that conceptual knowledge is more positively related to positive environmental attitudes than factual knowledge (29). This would suggest that young people who appreciate the concept of interdependence may have more positive beliefs about wildlife than those who know how animals are classified or that trout eat flies, for example. Without undermining the importance of teaching facts, perhaps greater benefits would be gained from developing basic concepts at ages earlier than most environmental education programs begin. This process could get started in the early elementary grades using the humanistic orientations discussed before in this chapter.

Introduced in an appropriate manner and supported with accurate background information, education materials on predator-prey relationships could be integrated into elementary school curricula and serve as the basis for ecological concept development. Despite teachers' uncertainties, young children from kindergarten to the third grade are able to accept the concept of predation (28). The wildlife preference results of the present study indicate that animals such as the eagle, owl, and bear could help to encourage the development of this concept.

Increase Opportunities for Direct Contact With Wildlife

Another key finding of this study was the important role played by wildlife-oriented activities in the development of knowledge. For example, we found that in general, activities exerted stronger influences over knowledge than attitudes did. Active behaviors that required direct involvement with live animals, such as fishing, hunting, and identifying birds, frequently had stronger and more consistent relationships with both attitudes and knowledge than did indirect wildlife-related behaviors such as various school activities and going to the zoo. The obvious implication is that new educational opportunities for direct contact and active involvement with wildlife will have far greater payoffs than continuing to rely on traditional sources of non-interactive contact. However, the value of particular indirect activities such as watching wildlife television shows and belonging to animal clubs was also clearly demonstrated and deserves further investigation. Feeding wildlife has been reported elsewhere as a popular activity of children (21, 25) and should also be examined in future studies of this kind.

For resource managers, the activity results should be particularly insightful because childhood participation in wildlife activities is a significant determinant of adult participation (33, 38). Certainly, opportunities for fishing, as the most popular wildlife activity of American youth, will be in great demand in the future. The demographic profile of wildlife-oriented recreationists can be expected to shift if fishing remains as popular with urban and suburban youth, young female birdwatchers continue to outnumber the males, and anti-sport hunting sentiment among rural youth is maintained at its present level. For the immediate future, public lands will feel the impact of young Americans' growing interest in wildlife. From 1983-1984, for example, the number of visits to national wildlife refuges doubled for schoolchildren actively pursuing the study of ecology and environmental relationships (36). Thus, resource managers can prepare for the approaching change in profile of wildlife enthusiasts--in number, demographic composition, and form of recreation sought after.

* * *

Despite potential problems associated with sampling respondents to a survey distributed by Weekly Reader, the authors hope the findings of this study will support a more concerted national education effort by filling part of the void of objective information about American youth and wildlife. The distinct shortage of this type of baseline information and the unavailability of measuring instruments has been inhibiting the planning, development, and overall effectiveness of environmental curricula in our public schools (9). This type of information can enhance federal public use programs designed to increase public understanding of wildlife on which the success of many federal resource programs depend. Because the wildlife interests and educational needs of American boys and girls, urban and rural residents, and children living in the South and Pacific Coast, for instance, are so very different, programs targeted for these groups can be designed appropriately. Although ethnic differences in children's perceptions of wildlife were not examined, they are documented elsewhere (21) and will require serious consideration as the demographic profile of the American public changes. The results also point toward the value and feasibility of developing ecological concepts in children at younger ages. Using parts of the present questionnaire, in fact, it has been reported that 4-H club alumni, who once participated in a wildlife extension education program, were more naturalistically oriented and knowledgeable than the American public (8). Within the current fiscal climate, there is a need to concentrate more on helping people to help themselves, which is the basic mission of extension education.

In conclusion, this study indicates that wildlife education efforts are likely to have positive impacts if they utilize children's existing orientations toward animals to foster an identification with the natural world, concentrate harder on developing in younger children conceptual understandings of the interrelatedness of life forms, and increase the number and quality of opportunities for very specific forms of contact with wildlife as well as important indirect sources which increasing numbers of urban children will rely on. Finally, these efforts will need to address the scarcity of baseline information on the wildlife orientations of different demographic groups of children.

APPENDIX 1

WEEKLY READER REPORTS

ON THE PRELIMINARY RESULTS

OF THE WILDLIFE SURVEY

Wildlife Survey Results

Sixth Graders Love Rabbits!

Which wild animals do sixth graders like best? A recent survey puts rabbits at the top of the list. What's at the bottom? Rats.

The wildlife survey was printed in a March issue of *Senior*. The survey asked questions about your knowledge of wildlife and your feelings about wild animals.

Thousands of you filled out the survey. Your teachers tallied your answers and mailed them to *Senior*. Here's some of what the surveys showed about sixth graders and wildlife:

You seem to have mixed feelings about wild animals.

For example, more of you like pet animals than wild animals. But nearly three-quarters of you feel strongly that it's fine for people to love wild animals as well as to love people.

Quite a few of you—40 percent—would be scared to touch a snake. But more of you—46 percent—said it wouldn't faze you.

More than half of you said you'd be perfectly comfortable camping where wild animals were around. But 38 percent said you'd rather be where lots of other people were—not where wild animals were.

You know some facts but not others about wildlife.

For example, more than three-quarters of you realized that the statement "Spiders have ten legs" was false. Most of you also knew that rabbits eat plants and that owls eat mice. But fewer than half of you knew that koalas—those cuddly creatures from Australia—are not really bears.

You don't spend a lot of time observing and studying wild animals.

More than half of you said you had gone to the zoo during the past year. But only a quarter of you had gone bird-watching. And only 42 percent had done any experiments in school to learn about wild animals.

SENIOR WEEKLY READER, May 6, 1983

eye ON SCIENCE

Weekly Reader Wildlife Survey Results

What ideas do fifth graders have about wildlife? Thousands of you answered the wildlife survey in the March 11 issue; and here's what you said:

- The animals fifth graders like the most are "lovable animals," with "animals in the woods" a distant second.
- The rabbit is the most liked animal. It is well ahead of the eagle, robin, and bear—the next three choices.
- The skunk, followed by the rat, is the most disliked animal among fifth graders.
- Fifth graders favor pets such as cats and dogs over wild animals.
- Twice as many fifth graders say they wouldn't mind touching a snake as say they would mind.
- Fifth graders strongly believe that love is a feeling people should have for animals as well as for people.
- The number of fifth graders who think that most wild animals are *not* dangerous is a little greater than the number of youngsters who think they *are* dangerous.
- The numbers are close, but a few more fifth graders say their dads hunt than say their dads don't hunt.
- Fifth graders report they watch many wild animal shows on TV. More than half watched more than five shows in the past year.

We thank you all for answering the wildlife survey. We especially thank the teachers for taking the time to complete the tally sheet.

(Weekly Reader Eye, May 6, 1983)

APPENDIX 2

WILDLIFE SURVEY QUESTIONNAIRE

WILDLIFE SURVEY

Questions are courtesy of the Department of the Interior, Fish and Wildlife Service

YOUR TEACHER WILL TELL YOU ABOUT THIS PAGE. WE WANT YOU TO ANSWER THE QUESTIONS SO YOU CAN TELL US WHAT YOU THINK ABOUT WILDLIFE.

1. *Circle one:* a. Boy b. Girl
   Complete: State _____ ZIP Code _____
   Age _____ School Grade _____
   Circle area where you live:
   (a) Urban (pop. 50,000 or more)
   (b) Suburban (pop. 6,000-50,000)
   (c) Rural (pop. 6,000 or fewer)
2. What animals do you like most? *(Circle one.)*
   a. Beautiful animals
   b. Animals the scientists study
   c. Animals in the woods
   d. Useful animals
   e. Animals important to the balance of nature
   f. Lovable animals

Do you **strongly agree** *(SA),* **agree** *(A),* **disagree** *(D), or* **strongly disagree** *(SD) with these sentences? If you are not sure, circle DK* **(don't know).**

3. I like pet animals such as cats and dogs more than I like wild animals. SA A D SD DK
4. I would be scared to touch a snake. SA A D SD DK
5. It's OK to hunt whales for food as long as there are a lot of them left in the world. SA A D SD DK
6. If I were to go camping, I would want to stay where lots of other people were, not where wild animals were around. SA A D SD DK
7. Love is a feeling people should have only for other people, not for animals. SA A D SD DK
8. Hunting wild animals for food is OK. SA A D SD DK
9. Most wild animals are dangerous to people. SA A D SD DK
10. Wild animals get lonely in the wilderness. SA A D SD DK
11. Hunting wild animals for sport is OK. SA A D SD DK
12. I don't like most animals near me. SA A D SD DK

Are these sentences **true** *(T) or* **false** *(F)? If you are not sure, it is better to circle DK* **(don't know)** *than to guess. (Answers 13-22 in Teacher's Edition)*

13. Most insects have backbones. T F DK
14. Spiders have ten legs. T F DK
15. Koalas are not really bears. T F DK
16. Snakes have a thin covering of slime in order to move more easily. T F DK
17. All adult birds have feathers. T F DK
18. Inchworms are in the same family of animals as earthworms. T F DK

What food does each animal eat most of the time? *(Circle one.)*

19. RABBIT	a. plants	b. mice	c. nuts
20. WOLF	a. deer	b. berries	c. grass
21. OWL	a. seeds	b. mice	c. foxes
22. TROUT	a. seaweed	b. lily pads	c. flies

Do you **really like** *(RL),* **like** *(L),* **dislike** *(D), or* **really dislike** *(RD) these animals? If you are not sure, circle DK* **(don't know).**

23. Coyote	RL	L	D	RD	DK
24. Rabbit	RL	L	D	RD	DK
25. Moose	RL	L	D	RD	DK
26. Mouse	RL	L	D	RD	DK
27. Wolf	RL	L	D	RD	DK
28. Owl	RL	L	D	RD	DK
29. Elephant	RL	L	D	RD	DK
30. Bear	RL	L	D	RD	DK
31. Robin	RL	L	D	RD	DK
32. Walrus	RL	L	D	RD	DK
33. Rat	RL	L	D	RD	DK
34. Skunk	RL	L	D	RD	DK
35. Eagle	RL	L	D	RD	DK

Circle your answers.

36. In the past year, have you gone hunting for wild animals? Yes No
37. Has your father gone hunting in the past five years? Yes No
38. In the past year, have you gone fishing? Yes No
39. In the past year, have you gone bird-watching (gone outside or taken a trip just to see or identify birds)? Yes No
40. If "Yes" to #39, did you use a field guide (bird book)? Yes No
41. How many kinds of birds can you identify on your own? 10 to 20 20 to 30 More than 30
42. In the past year, have you gone to a zoo? Yes No
43. In the past year, did your school class go on a trip to see or learn about animals? Yes No
44. In the past year, did your school class do any experiments to learn about animals? Yes No
45. In the past year, did your school class keep a live animal in the classroom? Yes No
46. Do you belong to an animal club? Yes No
47. In the past year, how many times did you watch a television program about wild animals (for example, "Wild Kingdom," "National Geographic" specials on animals, or Jacques Cousteau)? Never 1 to 5 times More than 5 times

REFERENCES

1. Bammel, Lei and Gene, Perceptions of Hunting and Hunters, 1980-1981 Proceedings of the Southeastern Recreation Research Conference, Southeast Forest Experiment Station, Asheville, North Carolina, 253-263, November 1982.

2. Bart, William M., "Hierarchy Among Attitudes Toward Animals", Journal of Environmental Education, 3(4): 4-6, Summer 1972.

3. Blanchard, Jay S., "Anthropomorphism in Beginning Readers", The Reading Teacher, 35(5): 586-591, February 1982.

4. Bowd, Alan D., "Young Children's Beliefs About Animals", Journal of Psychology, 110(2): 263-266, 1982.

5. Bowd, Alan D., "The Development of Beliefs About Animals", International Animal Action, Newsletter of the International Association Against Painful Experiments on Animals, London, England, Summer 1982, pages 8-9.

6. Bowd, Alan D., "Children's Fears of Animals", Journal of Genetic Psychology, 142: 313-324, 1983.

7. Burghardt, Gordon M. and Harold A. Herzog, Jr., "Beyond Conspecifics: Is Brer Rabbit our Brother?" BioScience, 30(11): 763-768, November 1980.

8. Byford, James L. and Sheila Munsey, "Attitudes on Wildlife and Knowledge Retained by 4-H Alumni", Transactions of the 49th North American Wildlife and Natural Resources Conference, pp. 410-420, 1984.

9. Childress, Ronald B., "Public School Environmental Education Criteria: A National Profile", Journal of Environmental Education, 9(3): 2-11, Spring 1978.

10. Collings, M. A. J., "Questionnaires and Changing Students' Attitudes to Animals", Journal of Environmental Education, 8(2): 37-40, Winter 1976.

11. Fortner, Rosanne F., "Influence of an Environmental Documentary On Knowledge and Attitudes: Three Studies", Human Dimensions in Wildlife Newsletter, Yale School of Forestry and Environmental Studies, New Haven, CT 06511, 4(1): 13-17, March 1985.

12. Hamilton, Clifford, "Project Learning Tree and Project WILD, Resource Models for Education at the Elementary and Secondary Levels", Transactions of the 47th North American Wildlife and Natural Resources Conference, pp. 248-251, 1982.

13. Herringa, Steven G., "American Public Attitudes Toward Hunting", Institute for Social Research, University of Michigan, Ann Arbor, Michigan, 1984.

14. Hogan, H. Wayne, "Factors Associated With the Attribution of Human Traits in Nonhumans," Journal of Social Psychology, 112: 161-162, 1980.

15. Horvat, Robert Emil, "Fifth and Eighth Grade Student Orientations Toward the Environment and Environmental Problems," Ph.D. Dissertation, University of Wisconsin, 1974.

16. Howard, Ronald A., Jr., "4-H Fish and Wildlife Programs: New Initiatives on Old Problems", Transactions of the 49th North American Wildlife and Natural Resources Conference, pp. 405-409, 1984.

17. Kellert, Stephen R., "Activities of the American Public Relating to Animals: Phase II", U.S. Government Printing Office #024-010-00-624-2, 1980. (Also available through National Technical Informaiton Service, U.S. Department of Commerce, Springfield, VA 22161, Accession #PB80-194525.)

18. Kellert, Stephen R. and Joyce K. Berry, "Knowledge, Affection and Basic Attitudes Toward Animals in American Society: Phase III", U.S. Government Printing Office #024-010-00-625-1, 1980. (Also available through National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161, Accession #PB81-173106.)

19. Kellert, Stephen R. and Miriam O. Westervelt, "Trends in Animal Use and Perception in Twentieth Century America: Phase IV", U.S. Government Printing Office #024-010-006-21-8, 1981. (Also available through National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161, Accession #PB82-194812.)

20. Kellert, Stephen R. and Miriam O. Westervelt, "Children's Attitudes, Knowledge and Behaviors Toward Animals: Phase V", U.S. Government Printing Office #024-010-00641-2, 1983. (Also available through National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161, Accession #PB83-211-474.)

21. LaHart, David E., "The Influence of Knowledge on Young People's Perceptions About Wildlife", Final Project Report to the National Wildlife Federation, College of Education, Florida State University, June 1978.

22. Leopold, Aldo, A Sand County Almanac, New York: Ballantine Books, 1966.

23. Llewellyn, Lynn G., "Who Speaks for the Timber Wolf?" Transactions of the 43rd North American Wildlife and Natural Resources Conference, pages 442-452, 1978.

24. Miller, J. D., "The Development of Pre-Adult Attitudes Toward Environmental Conservation and Pollution", School Science and Mathematics, 75: 729-737, 1975.

25. Piaget, Jean, The Child's Concept of the World, New York: Harcourt and Brace, 1929.

26. Pomerantz, Gerri Ann, "Young People's Attitudes Toward Wildlife", Wildlife Division Report Number 2781, Michigan Department of Natural Resources, 1977.

27. Pomerantz, Gerri, "A Look at Children Who Read Ranger Rick", Human Dimensions in Wildlife Newsletter, Yale School of Forestry and Environmental Studies, New Haven, CT 06511, 3(2): 1-7, July 1984.

28. Powell, Constance B. and Roger A. Powell, "The Predator-Prey Concept in Elementary Education", Wildlife Society Bulletin, 10(3): 238-244, 1982.

29. Richmond, J. M. and Morgan, R. F., "A National Survey of the Environmental Knowledge and Attitudes of Fifth Year Pupils in England", Environmental Education Report, ERIC/SMEAC Information Reference Center, January 1977.

30. Rohlfing, A. H., "Public Attitudes Toward Hunting and Hunters", Fish and Wildlife News, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C., August-September 1980.

31. Sharefkin, Belle D. and Ruchlis, "Anthropomorphism in the Lower Grades", Science and Children, 11:37-40, March 1974.

32. Shaw, William W. and William R. Mangum, "Nonconsumptive Use of Wildlife in the United States", Resource Publication 154, Fish and Wildlife Service, U.S. Department of the Interior, Washington, D.C. 20240, 1984.

33. Sofranko, Andrew J. and Michael F. Nolan, "Early Life Experiences and Adult Sports Participation," Journal of Leisure Research, 4: pages 6-18, Winter 1972.

34. U.S. Department of Commerce, "School Enrollment - Social and Economic Characteristics: October 1979", Bureau of Census, pages 15 and 46.

35. U.S. Department of Education, Unpublished data, National Center for Education Statistics, Washington, D.C., Fall 1981.

36. U.S. Fish and Wildlife Service, "Visits to Refuges-FY 1984," Unpublished report of the Wildlife Resources Program, Department of the Interior, 1984.

37. Westervelt, Miriam O., "A Provocative Look at Young People's Perceptions of Animals," Humane Education, 23-28, December 1983.

38. Yoesting, Dean R. and Dan L. Burkhead, "Significance of Childhood Recreation Experience on Adult Leisure Behavior: An Exploratory Analysis", Journal of Leisure Research, 5: 25-36, Winter 1973.

☆U.S. GOVERNMENT PRINTING OFFICE: 1986 498 443 42425